MARINE REVIEW

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AN ORDER FOR TWO MORE LARGE FREIGHTERS.

Mr. J. C. Gilchrist of Cleveland is evidently determined to remain in the vessel business on the lakes as an individual owner, notwithstanding the fears that have been expressed regarding the operations of the large steel concerns. Only a few weeks ago he placed orders with the American Ship Building Co. for six steel steamers of about 5,000 tons capacity each. Within the past few days he has increased the number of vessels to eight. The two latest steamers are to be of 10 ft. more length and 2 ft. more beam than those first ordered, but the power will be the same, namely, triple expansion engines and Scotch boilers, the latter provided with the Howden system of hot draft. Dimensions of the new vessels will be 376 ft. over all, 356 ft. keel, 50 ft. beam and 28 ft. depth. They will be built at West Bay City. This practicaly exhausts the capacity of the American Ship Building Co. as regards vessels to be delivered on the opening of navigation next spring.

It is understood that Mr. C. W. Elphicke of Chicago, who placed an order with the consolidation a short time ago for a large freighter to be built at the Chicago works, still contemplates ordering another vessel of about the same dimensions, but even if the contract is placed during the present month it is not now probable that delivery can be secured earlier than about June or July of next year. It is also understood that a party has been made up in Chicago for the building of a steamer of Canadian canal dimensions.

A regular meeting of the executive board of the American Ship Building Co. was held at the headquarters of the company in Cleveland, Wednesday, but it was not learned that any business of importance was transacted, further than an order to pay the regular quarterly dividend of 1¾ per cent. on the preferred stock. The dividend will be paid Oct. 15.

The steamer Capt. Thomas Wilson, built by the Jenks Ship Building Co. of Port Huron, for the Wilson Transit Co. of Cleveland, cleared from Port Huron, Wednesday, on her maiden trip. This is the second steel steamer built by the Jenks Co. The Capt. Wilson is of about 6,000 gross tons capacity.

The Detroit Ship Building Co. has re-elected the following officers for the ensuing year: Alexander McVittie, president; W. C. McMillan, vice-president; M. E. Farr, secretary and treasurer.

SHIP BUILDING DURING THREE MONTHS OF 1900.

Washington, D. C., Oct. 3—The bureau of navigation reports 308 sail and steam vessels of 88,790 gross tons built in the United States and officially numbered during the quarter ended Sept. 30, 1900, as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	129	18,880	51	4,095	3	3,360	7	10,192	190	36,527
Pacific	10	6,748	16	3,861	...	.....	2	293	28	10,902
Great Lakes	5	108	18	482	1	2,790	8	33,677	32	37,057
Western Rivers	16	297	42	4,007	.....	.....	.....	.....	58	4,304
Total	160	26,033	127	12,445	4	6,150	17	44,162	308	88,790

The largest steel steam vessels included in these figures are the Morro Castle, built for the New York & Cuba Mail Steamship Co., and the Lafayette, Harvard, Cornell, Princeton and Rensselaer, built for the Pittsburg Steamship Co. (Carnegie) of the great lakes.

During the corresponding quarter ended Sept. 30, 1899, 296 sail and steam vessels of 73,230 gross tons were built in the United States and officially numbered as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	137	13,325	44	2,040	2	1,179	16	17,730	199	34,274
Pacific	13	3,932	19	1,688	.....	.....	.....	.....	32	5,620
Great Lakes	6	58	17	963	.....	.....	7	29,873	30	30,894
Western Rivers	5	132	29	2,260	.....	.....	1	50	35	2,442
Total	161	17,447	109	6,951	2	1,179	24	47,653	296	73,230

Quite a large order for steel railway cars is reported from Pittsburg. It is announced that President Cowen of the Baltimore & Ohio Railroad Co. on Saturday closed a contract with the Pressed Steel Car Co. for 6,000 cars to cost $1,100 each. Delivery is to begin at once. The order includes 4,000 gondolas and 2,000 self-clearing hopper cars. Ninety thousand tons of steel costing $22 a ton, or $1,980,000, at the present market price of plates, will be required for the manufacture of the cars. The New York Central railroad contracted for 9,000 wooden cars some time ago, but these, it is said, cost only a little more than half the price of the cars made from steel. The latter have a capacity of 100,000 lbs., while the wooden cars carry only 50,000 lbs.

The torpedo boat destroyer Decatur was launched last week at the William R. Trigg Co.'s ship yards, Richmond, Va. The ceremonies were simple. The keel blocks and shores were knocked from under the boat, and it slipped gracefully down the ways into the waters of the dock. Miss Maria Ten Eyck Decatur Mayo of Norfolk, a direct descendant of Commodore Stephen Decatur, after whom the vessel is named, smashed the customary bottle of champagne across her bow and named the craft. Not less than 8,000 persons saw the Decatur take her first bath, and among these were a number of naval officers, who visited Richmond to attend the event.

RAILROAD ORDERS IMPROVE IRON TRADE.

The disposition of the railroads to place orders for rails and for cars has caused a better feeling among manufacturers of iron and steel. The announcement, several days ago, that the steel rail manufacturers had reduced standard sections from $35 to $26 at mill was met by the opinion that the price was still too high to induce buying on a large scale. It was thought the railroads would order only what was absolutely necessary, even though, as intimated, the $26 rate was good for only thirty days. But fortunately this opinion is not borne out by developments of the past week. The Iron Trade Review says:

"The rail situation is at the moment the leading feature in the iron trade. Contrary to prediction the railroads are disposed to take hold at the $26 price, and some of them are not waiting until after the election to cover their needs. Judging from inquiry already in hand and the preliminary estimates given out from official sources, the buying for next year will be large. Chicago has sold more than 30,000 tons the past week. Pittsburg has a large business in hand. The Pennsylvania order, soon to be placed, is expected to aggregate 150,000 tons. Baltimore & Ohio officials have announced that they will buy 40,000 tons. Several eastern lines have been heard from in a tentative way, with inquiries running over 50,000 tons. In the Cleveland district 20,000 tons for electric lines are being figured upon, and nearly as much more for steam lines. Coming some weeks earlier than usual, the rail demand is expected to assume proportions that will make no pressure by the rail mills upon the billet market, and thus will exert a steadying influence on finished lines. Further proof of the ability and the readiness of the railroads to buy comes in the Baltimore & Ohio order for 6,000 steel cars and 3,100 wooden cars placed in the past week. The steel car order will require 100,000 tons of steel, of which 60,000 tons is plates, or as President Cowen puts it, the equivalent of the steel plates required to build ten of the largest steel freighters afloat. The effect of this order will be to strengthen the plate market, which has been drooping again in the past three weeks. In general the market of the week has shown increasing demand. Whether because confidence is growing in the result of the election, or simply because of the simultaneous exhaustion of stocks under the large consumption recently in evidence, there is undoubtedly larger buying. As heretofore the end of the year is about the limit of ordinary contracts, though there are exceptions; but the whole market is working into a position from which an advance would not be difficult under the free buying looked for, with the election out of the way."

RAPID WORK ON A LARGE FREIGHTER.

A Detroit correspondent says: "Officials of the Detroit Ship Building Co. are expecting to turn over to her owners tonight (Tuesday) the steamer Howard L. Shaw, launched only seventeen days ago. They have made a record in putting in the machinery of this vessel and otherwise equipping her after launching. It has all been done in fourteen working days, and is undoubtedly the fastest work of its kind ever heard of in this country. The Shaw is a 6,000-ton ship with big triple expansion engines, and requiring in engine department and crew's quarters all the labor that is necessary to the outfitting of the best of the lake freighters. To have done all this in fourteen days is certainly a rare achievement. There was no overtime of any kind, excepting in the electric wiring, which was not done by the ship building company. Supt. Calder is the most delighted man in Detroit, as he feels that this rapid work on the Shaw was due to every department of the company doing its part with a willingness that means good organization. The Shaw was launched Sept. 15. Ballast pumps were the only machinery aboard. On Monday, the 17th, the men at the Orleans street works began hoisting machinery into the ship. At 9 a. m. the following Wednesday, engines and boilers were in place, and Thursday night saw work completed on the main steam and feed pipes. Friday afternoon, the 21st, boilers were pumped up with water and a preliminary test made. The next morning, Saturday, at 9 a. m., the boilers were inspected by government officials and they were fired up in the afternoon. One or both boilers have had steam on ever since. On Wednesday and Thursday following (26th and 27th) engines were worked at the dock, and, when found in order, they were cleaned up for the painters. In the meantime the work of building cabins, which was accomplished in twelve days under contract with J. Vinton & Co., was going on rapidly under the direction of Mr. Edward Rogers, so that by the night of Saturday, the 30th, the ship was finished up to the point of taking aboard her furniture, which was done Monday morning. Then the engines were indicated to prove valve setting, the ship's crew having taken charge so as to become accustomed to their work as early as possible. It is expected that the Shaw will go to the fuel dock today (Tuesday, Oct. 2) and get away tonight for her first cargo."

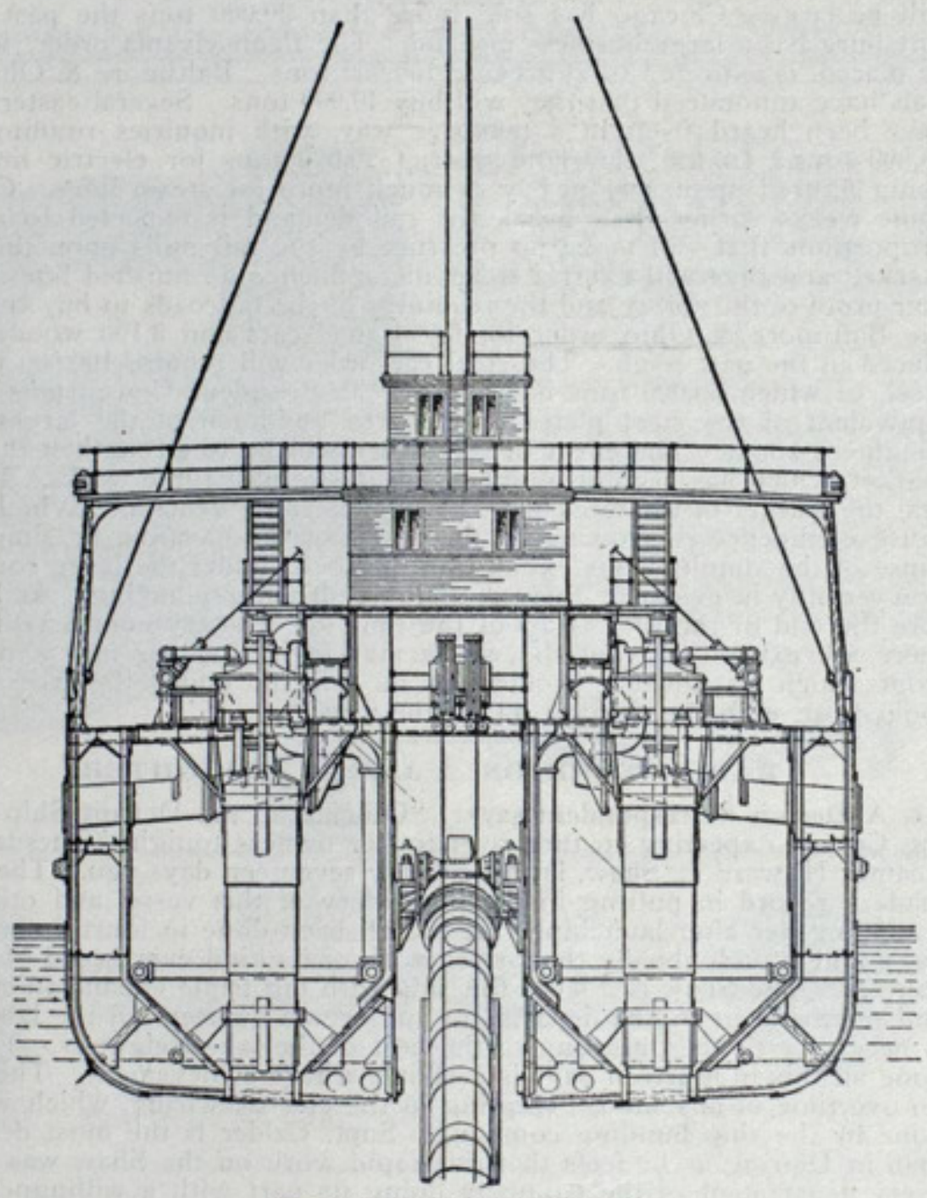
COAL EXPORTS INCREASE.

Coal exports from Norfolk, Va., continue to increase in volume. Within the past week six steamships carrying, approximately, 25,000 tons of Pocahontas coal, have sailed. Some of these shipments are especially significant. The Spanish ship, Begona, for instance, took a full cargo of Pocahontas coal for the Island of Malta, the great English naval stronghold. This coal is for the British admiralty. The Italian steamship Citta Di Messina took a full cargo of coal for Messina; the British steamship Strathberg one for Nagasaki; the British steamship King Frederick one for Tampico, and the Norwegian steamship Fri took one out for Halifax. No shipments for Russian account have as yet, so far as known, been made; but England, Japan and Italy are apparently storing contraband of war at their coaling stations at a great rate. Much of the coal, it appears, is for commercial purposes, but a good deal of it will be burned by warships.—Coal Trade.

MAMMOTH HOPPER DREDGES.

DESCRIPTION OF ONE OF THE LARGE MACHINES THAT ARE TO BE USED IN THE IMPROVEMENT OF NEW YORK HARBOR—BUILDING AT THE WORKS OF THE MARYLAND STEEL CO.

Sparrow's Point, Md., Oct. 2.—Everything is in readiness to launch here today at the works of the Maryland Steel Co. (marine department) one of the two mammoth steel hopper dredges, building for the Metropolitan Dredging Co. of New York, and which are to be used in the execution of a contract for the deepening and widening of one of the principal channels in New York harbor. These dredges are the largest in the world and the marine department of the Maryland company, which is under the management of Mr. Andrew G. Wilson, is to be congratulated for its ability in designing and constructing them without American precedent of any kind to draw upon. The marine works here are, in fact, rapidly assuming a very prominent place in the ship building industry of the country. A glance over the yard shows, in addition to the dredges, three torpedo boat destroyers, to be among the largest and fastest in the United States navy, all plated up; a large car float nearly finished; the keel laid for a collier for the Boston Tow Boat Co., and numerous long lines of piles where the two 500-ft. tramp steamers for Boston parties are to be laid down. Then there is also nearly completed the largest floating dry dock in the world, building for the government and to be located at Algiers, La. The order for the two 500-ft. tramps is the direct result of success with the Boston colliers built at this yard, since the Boston Tow Boat Co. is parent to the scheme and their engineer will supervise the construction of the new steamers.



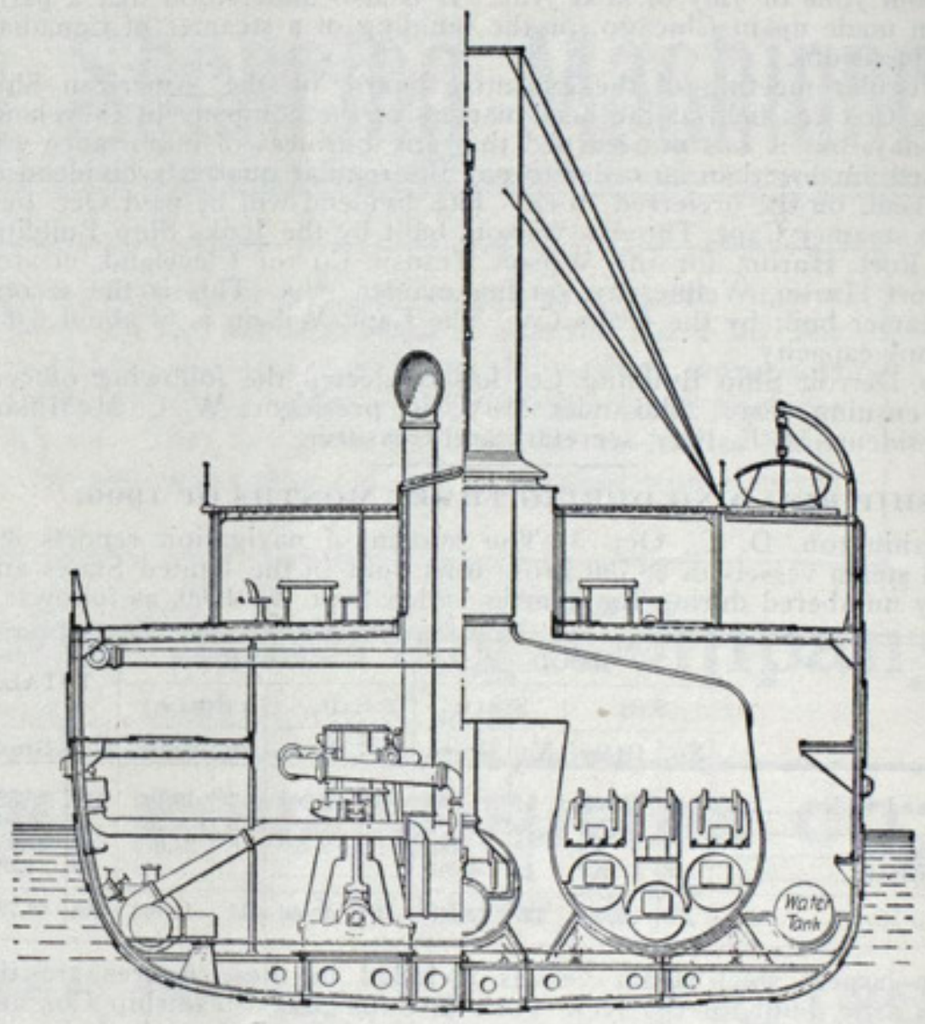
SECTION THROUGH HOPPERS.

The two hopper dredges, to be named Thomas and Mills, are being built to carry out the contract of Andrew Onderdonk with the United States government for the new east channel, New York harbor. They are similar to those used at the mouth of the Mersey for keeping channels clear for Liverpool shipping. Mr. Onderdonk's contract involves the improvement of New York harbor by a deep channel 2,000 ft. wide and 40 ft. deep, from the Narrows by the socalled east channel across Sandy Hook bar to the open sea. The United States engineer in charge estimates the amount of excavation necessary to complete the work to be about 40,000,000 cubic yards, the excavated material to be removed by the contractor to a place of deposit in deep water in the ocean, an average distance of about eight miles. In order to carry out this contract Mr. Onderdonk, with Mr. D. O. Mills and General Samuel Thomas, organized the Metropolitan Dredging Co. and decided to build large machines of the hydraulic type. Messrs. Walter M. Bailey and James Symington were engaged to prepare plans and specifications, and visited Liverpool to inspect the large hydraulic dredges on the Mersey. Mr. A. G. Lyster, chief engineer of the Mersey docks, was consulted in the preparation of plans for the vessels. It is expected that the channel will be completed in five years, when the largest steamers can enter the port of New York at any stage of the tide.

The same general principles embodied in the Liverpool dredges Brancker and Crow have been adopted in the dredges building at Sparrow's Point, but there are many improved appliances and arrangements both in the hulls and machinery. The dredges will carry 40 per cent. more material in the hoppers than the Liverpool dredges, and can load in about the same time. The load is better distributed and the construction much stronger, and the boats have more beam and more depth, with less length. They are expected to develop a speed of not less than 10 knots per hour in actual service. They are of about 7,000 tons load displacement each, are self-propelling, with twin screws, and have hulls built of mild steel throughout. They are 300 ft. in length, 52 ft. 6 in. in breadth and 25 ft. molded depth. An innovation in the construction of the hulls, which is particularly noticeable, is the entire absence of sheer, the vessels being the same depth throughout. To avoid the appearance of being hogged, the plating is given about 18 in. of sheer at each end. There are two pole masts and one stack; all being vertical. The foremast is fitted with one boom, and the mainmast with two.

The crew have accommodations under the forecastle deck and, contrary to the usual custom, are provided with very comfortable quarters fitted with iron bedsteads. On each side at the forward end there is a large room fitted with three shower baths and other fixtures. Under the poop are accommodations for the engineers, government inspectors, cook and steward, each being provided with a large room. At the after end are the toilet rooms, provided with showers, tubs, etc. Alongside the engine and boiler enclosures in the house are provided officers' and crew's mess rooms and two pantries with lifts to the galley above. The captain has a large cabin and stateroom on the level of the walk over the landers. In the same house are quarters for the first, second and third mates, and one spare stateroom. On top of this house is the pilot house with flying bridge extending to the side of the ship.

Hoppers for the dredged material extend for 125 ft. in the middle of the ship. There are six hoppers on each side of the suction well, four being 20 ft. long by 18 ft. wide, and two 22½ ft. long by 18 ft. wide. The total capacity of the hoppers is 2,800 cubic yards. Forward of the hoppers and extending the full width of the ship and for 50 ft. fore-and-aft, is the dredging machinery space. A 48-in. Morris centrifugal pump is located in the center, with side pipes to the suction and discharging into two distributing pipes. This pump is driven by two horizontal tandem compound condensing engines with cylinders 17 and 30 in. in diameter with 36 in. stroke. The pump is guaranteed to throw 75,000 gallons per minute and be capable of overcoming a resistance equal to about 40 ft. head. Forward of this pump is a large compound condensing pump of the Stilwell-Bierce duplex type, of which the steam cylinders are 18 and 30 in. diameter and the water cylinders 24 in., with a stroke of 24 in. This actuates the hydraulic jets on the suction drag and in the discharge valves of the hoppers. A hydraulic duplex pump with water plungers 6 in. in diameter by 18 in. stroke, capable of pumping against 1,000 lbs. pressure, is used for operating the hydraulic cylinders to the discharge valves and also the hoist for the suction pipe.

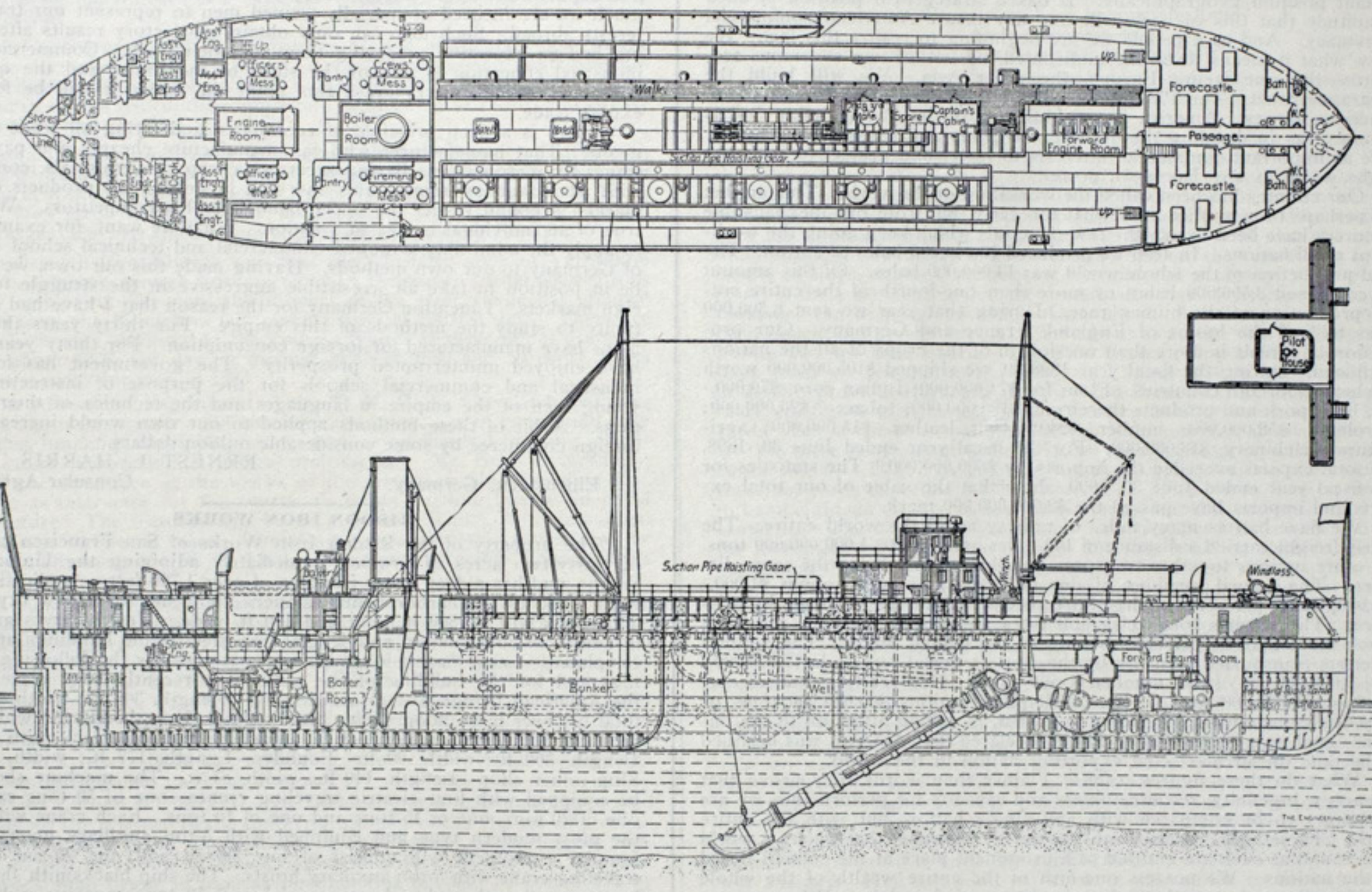


SECTIONS THROUGH ENGINE AND BOILER ROOMS.

Aft of the hoppers is located the boiler room. The boilers are 14 ft. in diameter by 11 ft. 10 in. long, and are designed for a working pressure of 180 lbs. They are fitted with Ellis & Eaves induced draft. A small donkey boiler 7 ft. 6 in. in diameter by 9 ft. long is placed between the main boilers. Aft of the boilers are located the two propelling engines, driving twin screws. The engines are of the inverted cylinder, direct-acting, triple expansion type, with cylinders 18, 28 and 45 in. diameter, with a common stroke of 30 in. The high and intermediate cylinders are provided with piston valves and the low pressure with slide valves. The engines are built with cast iron columns front and back and the condenser is independent, with vacuum and circulating pump. An electric lighting plant, evaporator and distiller are also supplied.

The operation is as follows: After lowering the suction tube into the water and exhausting the air from the 48-in. centrifugal pump and connections by the 4-in. air ejector, the pump is charged and ready to start; after starting, the pump is run until the hoppers are filled with water and overflowing the expansion tanks, during which time the suction pipe is lowered until it is about 10 ft. below the bottom, the materials being taken by the suction as fast as it is lowered into the sand. After the suction is lowered sufficiently deep into the material the boat is moved forward at the rate of 25 or 30 ft. per minute, thereby giving the suction

all the material that it can raise and deliver into the hoppers. When the hoppers are filled with material, the suction pipe is raised and the pump stopped, and the dredge proceeds to sea. When near the dumping grounds the large compound pumps are started, supplying water to the jets in the discharge valves, thereby lightening up the sand in the hoppers and freeing the valves from the packed sand so that they can be raised more easily. When ready to dump, the pressure from the hydraulic pump is turned on to the 12-in. hydraulic cylinders, one of which is located over the center of each hopper. These cylinders are connected by side rods to the large trunk valves 5 ft. in diameter by 21 ft. long, extending through the sand to a seat at the bottom of the inclined hopper outlets. The valves are raised in this way about 3 ft., allowing the sand to be discharged through the discharge ports into the sea. While the valves are being raised the jets above referred to are acting upon the sand with a pressure of about 60 lbs. per square inch, greatly facilitating the discharge of the materials. As soon as the valves are opened, the suction pipe is lowered into the water and the 48-in. centrifugal pump is started, the clear water being pumped through the distributing pipes and through outlets into the flushing pipes which are located at the top of the inclined bottoms of the hoppers. These flushing pipes are provided with perforations through which the water spurts, thereby greatly increasing the discharge of material and washing the hoppers clean before closing the valves. The trunk valves and the expansion tanks are built in accordance with the patents of Mr. A. G. Lyster, chief engineer of the Mersey docks.



HOPPER DREDGE FOR NEW YORK HARBOR WORK—BUILT BY MARYLAND STEEL CO.

NAVAL ESTIMATES FOR 1902.

Naval estimates of the year have been prepared and are before the secretary for review. They will probably amount to $72,000,000 in their approved form. The needs of the service have never been so great as at the present time and the naval appropriation bill of the next session of congress will be the largest on record. A number of new vessels will be provided for, although the appropriation for that work will not have to be made at once. It will require $20,000,000 to complete the work on ships of war at present under way or authorized. The sum allotted for repairs of ships in commission is growing steadily, and it is expected that fully $10,000,000 will be required next year for this work, with perhaps a deficiency estimate later in the year. The department is anxious to provide for coaling stations, and this will require considerable money, especially as it involves the purchase of large tracts of land on the sea coast and the acquirement of special mechanical facilities for handling fuel. A large storehouse for the torpedo boats of the navy must be provided at an early day. The item of coal for ships of war will be a large one this year. All supplies have increased in cost and the demand for larger quantities is increasing steadily.

With a larger operation of mills than at any time in months, the iron trade gives outward signs of prosperity, but prices are far from satisfactory to the average producer. Consumption is on a scale which by comparison with any year save 1899 appears phenomenal; but competition is active, and buyers are making the fewest possible committals. The uncertainties of the future are all loaded upon the primary producer and caution dominates the situation. Under such conditions prices cannot advance, and none in the trade anticipates any departure from the present policy until the election uncertainty is settled.—Iron Trade Review.

MAIDEN TRIP OF THE LEYLAND LINER DEVONIAN.

The steamship Devonian, the latest addition to the Leyland line fleet, arrived in Boston last week on her maiden trip. She is a sister ship to the Winifredian, which has been in the Liverpool-Boston service a little over a year, and will substantially enlarge the rapidly growing passenger service of the Leyland line between these two ports. She left the Riverside landing stage at Liverpool Saturday afternoon, Sept. 15, directly after the arrival of the special boat train from London, and but for adverse winds and heavy seas during the first half of her voyage would have reached Boston earlier. Her average daily record should be 350 knots, but a southwesterly gale succeeded on two days in keeping her down to less than 250 knots.

Like the other recent boats of the Leyland line, the Devonian was built to carry as many passengers as will not interfere with her maximum capacity as a freight carrier. To this end her passenger accommodations are all amidships in a deck house occupying the upper portion of the center of the ship. On the main deck are the majority of the staterooms, the dining saloon and the officers' quarters; on the promenade deck above are about a dozen more rooms and the music room, and still higher, on the bridge deck, is the captain's room, the navigating headquarters, and another room or two for passengers who may prefer the airiness of a position only a few feet removed from the bridge. The entire passenger portion of the ship is designed with a view to giving travelers a maximum of comfort and a minimum of those inconveniences with which every sea voyage is inseparable. The rooms are all large and airy, the berths wider than the average and the toilet accommodations of the latest and most novel pattern. The inside rooms are all ventilated directly from the outside, and are lighted in daytime in one direction from the outside contiguous room and in the other from the passageway running fore and aft. At night the entire ship is of course lighted by electricity. The promenade deck is wide and commodious and the passengers have also the privilege of roaming at will over the bridge deck and other portions of the boat not ordinarily open to the public in transatlantic steamships which carry a large number of passengers. The total passenger capacity of the Devonian is about 140, all first-class. No second cabin or steerage are carried.

The Devonian was built by Harland & Wolff of Belfast and was launched about three months ago. Her dimensions are 570 ft. over all, with a beam of 59 ft. and a carrying capacity of 11,000 tons. It is estimated that she could steam around the world without recoaling, and in addition to a cargo of 1,000 horses and 1,000 troops would still have room for a freight of between 3,000 and 4,000 tons of stores. She has four masts and one funnel, and is one of the largest steamships now making regular voyages to Boston.

A dispatch from Aberdeen, Wash., says that H. N. Anderson of Anderson & Middleton, and associates, are to start a new ship yard, which will be the third industry of the kind in Aberdeen. They are now in communication with one of the best ship builders on the Pacific coast. The location will be next to the Anderson & Middleton mill, and the yard will have ways for three ships. Lindstrom Bros., ship builders, are negotiating with Samuel Benn for additional space in order to place four vessels on the ways at one time, instead of two.

EXPANSION OF EXPORT TRADE.

THE UNITED STATES IS STRATEGETICALLY THE EXPORT NATION OF THE WORLD—WHAT SOME FIGURES TEACH.

We are living in a commercial age. All the energies of the human race are focused toward one goal—commerce. To further commerce inventors toil to construct locomotives which will lessen the distances between the north and south, east and west. In the interests of freight they build gigantic steamships which will bring the hemispheres closer together. With ever increasing perseverance they seek to discover, and apply, some new principle of mechanics, which will lighten the burdens of human labor. To accelerate trade skilled diplomats strive to win vantage ground for their respective countries in every part of the world. In this connection independent cables are being projected to various possessions over sea. Enormous navies are being planned and built for the purpose of protecting merchandise upon the oceans. To secure further markets, the nations are rivaling each other for the control of the remaining undeveloped portions of the earth. Uncivilized and half-civilized peoples inhabiting great territories must make way for modern physical science. The theories and dreams of fifty years ago have become the practice of today.

Of all countries in the world the United States occupies the most important position geographically. It has a strategetical position of such magnitude that this of itself will one day insure American commercial supremacy. And as a people we are beginning to realize this fact. We know what it means to be the undisputed masters of two enormous seaboards—the one facing Europe, the other Asia. We will build the Nicaragua canal. The Philippines will be developed into strongholds of American power. America is reaching across the Pacific today and is having a say in deciding the destinies of China and eastern Asia, for we have as important commercial interests to foster and protect in that part of the world as any European power.

Our country has been called the workshop of the world. This epithet has perhaps been applied somewhat too early, but from our inexhaustible resources have been drawn the raw materials which keep going the workshops of all nations. In 1896 we produced 10,000,000 bales of cotton. The total production of the whole world was 13,000,000 bales. Of this amount we consumed 3,500,000 bales, or more than one-fourth of the entire cotton production of the human race. During that year we sent 6,500,000 bales to feed the looms of England, France and Germany. Our production of cereals is more than one-fourth of the crops of all the nations combined. During the fiscal year 1898-99, we shipped $105,000,000 worth of wheat to foreign countries. Flour for $74,000,000; Indian corn, $70,000,000; beef, pork and products therefrom, $126,000,000; tobacco, $26,000,000; petroleum, $52,000,000; lumber, $24,000,000; leather, $15,000,000; agricultural machinery, $13,000,000. For the fiscal year ended June 30, 1898, our total exports exceeded the imports by $600,000,000. The statistics for the fiscal year ended June 30, 1900, show that the value of our total exports and imports have passed the $2,000,000,000 mark.

We have half as many miles of railway as all the world entire. The yearly freight carried a distance of 100 miles amounts to 1,000,000,000 tons. All other nations together transport only half as much for the same distance. The annual earnings of our railroads amount to about $1,000,000,000, or 50 per cent. of the entire receipts of all the railroads in existence. The world's total telegraph lines amount to 5,000,000 miles, of which more than 50 per cent. belong to the United States. The number of letters transported annually by the world's postal service is 17,000,000,000; 5,000,000,000 of this number is our share. Our yearly output of coal reaches 200,000,000 tons. That of all other nations 400,000,000 tons, or only double as much. The London Statist, in calling attention to the immense coal area of the United States, declared that America was destined to become the greatest coal exporting nation in the world.

What do these figures teach? Plainer than words they prove that in energy, ingenuity, resourcefulness and capacity for performance we are no longer to be compared with any single nation, but with the entire world. These figures are the most powerful argument that we are a world power, and as such are entitled to a prominent place at the council board of the nations. We possess one-fifth of the entire wealth of the whole world, and one-twentieth of the population of the globe. When we examine the relation of the one toward the other among our people we are made aware of many dark spots and numerous shadows. The control of wealth is one of the most difficult problems with which the human race must grapple. This problem is rendered more difficult by the laws of nature, which cause all the conditions and necessities of life. The iron hand of nature made manifest in the necessity of three meals a day has no conscience. It is this very necessity for food and clothing which has built up the great fabric of modern commerce. Land is the foundation stone of our existence. Upon this basis have been reared the pillars of labor and capital. Production is caused by consumption and there can be no consumption without production. The one serves the other's purpose. The same is true of labor and capital. There can be no capital without labor and it is difficult to conceive how labor could long exist without capital. Dead capital is well named, for it contributes nothing to the wealth of the human race. Idle labor stagnates capital and if long persisted in would soon bring both to the verge of ruin. It is the duty of capital to raise the dignity of labor. And as a class we believe that skilled labor in America is gradually reaching a higher and more satisfactory social status. Shorter hours and higher wages are enjoyed by American labor than in any European country. Our workmen have the benefit of better labor-saving machinery. And the more intricate and better the machinery used, so much higher must be the wage rate, and proportionately less therefore is the danger of personal competition. We also believe that the mutual understanding between employer and employe in America is of such a character that it leads to greater results than in Europe. For example, there is no obstacle in the way of a skilled workman making his observations known to his employer, who in turn understands how to encourage and reward the same. With us labor is paid for what it does, and the results achieved are manifestly greater than in Europe, where labor is apparently paid for time occupied in accomplishing something.

In the expansion of American trade lies the solution of many problems at home. Every year our increase in production for export is greater than is our production for home consumption. The statistics for the year ended June 30, 1900, show that we exported more than $1,300,000,000 worth of products; 31 per cent. of this grand total comprised manufactured articles. In comparison with 1891 the export of manufactured articles shows an increase of 150 per cent. This increase has very materially raised the wage rate throughout the United States, especially during the past four years. Any curtailment of our exports in any channel would be felt immediately by laborer, farmer and manufacturer. For so intimately dependent is the one upon the other today, that the interests of all must be equally fostered in order to maintain a proportionate degree of prosperity. In order to retain the desired equilibrium of welfare at home, our energies will be bent as never before in winning foreign markets. Every advance made in the field of foreign commerce means so much more profit for the manufacturer, so much more wages for the workman, therefore increased prosperity for the country in general.

Our export trade is only in its beginning. Today we rank as the third commercial nation, without our having made any special efforts to become so. The growth has been very natural, foreign countries being the solicitors rather than the solicited. Our manufacturers are just beginning to realize what a great field export trade presents them if systematic efforts are made in this direction. But there are many obstacles in the way before the American exporter will be able to throw the whole weight of America's inexhaustible resources on the world's markets. Without a thorough study of the needs of foreign peoples our manufacturers will find export trade uphill work. Every year it becomes more apparent how much we are in need of specially trained men to represent our trade interests abroad. Such men can only obtain satisfactory results after having had an education preparing them for such work. Commercial and industrial education is one of the signs of the times, and the quicker American manufacturers grasp this point the better it will be for our export trade.

There is a deep principle of economics underlying all trade movements. That manufacturer who can manufacture cheaply and pay high wages by reason of his having access to cheap raw materials, combined with advantageous freight rates and skill in getting his products on the market is bound to get the upper hand over his competitors. What is true of an individual is true of a nation. What we want, for example, is to apply the admirably arranged commercial and technical school system of Germany to our own methods. Having made this our own, we would be in position to take an irresistible aggressive in the struggle for foreign markets. I mention Germany for the reason that I have had opportunity to study the methods of this empire. For thirty years the Germans have manufactured for foreign consumption. For thirty years they have enjoyed uninterrupted prosperity. The government has founded industrial and commercial schools for the purpose of instructing the young men of the empire in languages and the technics of their vocations. A bit of these methods applied to our own would increase our foreign commerce by some considerable million dollars.

ERNEST L. HARRIS,
Consular Agent.

Eibenstock, Germany.

RISDON IRON WORKS.

The property of the Risdon Iron Works of San Francisco consists of thirty-two acres of ground, immediately adjoining the Union Iron Works, and has a deep water frontage of over 1,700 feet. Application has been made to the harbor commissioners for a site for a new dry dock. This dock will be 500 ft. long and 100 ft. wide. New wharves are now in course of construction and several new steel frame buildings are contemplated. Large orders for structural materials for the following buildings and for the building of the same have recently been placed with the American Bridge Co: Machine shop—Length, 308 ft.; width, 100 ft.; total lift over main floor, 45 ft. Boiler shop—Length, 140 ft.; width, 180 ft.; total lift over main floor, 40 ft. Machine and ship blacksmith shop—Length, 300 ft.; width, 60 ft. Foundry—Length, 177 ft.; width, 160 ft. Ship joiner shop—Length, 140 ft.; width, 81 ft. The machine shop will be equipped with four electric traveling cranes—one of 50 tons capacity, one of 20 tons, one of 15 tons and one of 10 tons. Each crane will be of the most modern type and equipped with 5-ton auxiliary hoists. The foundry equipment will consist of one 30-ton and one 20-ton electric traveling crane with 5-ton auxiliary hoists. The ship blacksmith shop will be equipped with eight jib cranes of 5 and 10 tons capacity each. The machinery equipment throughout will consist of only the most modern tools. The entire plant, with the exception of steam hammers in the blacksmith shop, will be operated by electricity, and contracts have recently been placed with the Independent Electric Light & Power Co. of San Francisco to furnish power for the plant. Direct current will be used for the cranes and an alternating current for the machinery equipment. Separate motors will be installed in each department.

Reorganization of the Brown Hoisting & Conveying Machine Co. of Cleveland was effected on Oct. 1. The new organization is the Brown Hoisting Machinery Co. It takes over the entire plant, business, property, accounts, contracts, assets, etc., of the old company. Capital of the new company, organized under Delaware laws, is $1,000,000 of preferred and $1,000,000 of common stock. The entire interests of stockholders have been re-invested in the new corporation, together with a large addition of new capital. Officers are: Fayette Brown, president; Alex. E. Brown, vice-president; Harvey H. Brown, treasurer, and F. G. Tallman, general manager.

One of the finest boiler shops in the country will soon be completed at the works of the Kingsford Foundry & Machine Co., Oswego, N. Y. It is 120 ft. wide and 260 ft. long and is being built by the American Bridge Co. The equipment will include a 40-ton electric crane, three hydraulic riveters and the necessary small tools. This company enjoys a large trade with Atlantic coast ship builders and vessel owners. They make a centrifugal pump that is especially adapted for circulation purposes in connection with the surface condensers that must be used on all vessels building on the great lakes for salt water service.

The Nickel Plate road announces to the public that Euclid avenue station, Cleveland, is now open for all trains. Passengers may now secure tickets and have baggage checked for all trains east or west bound at this station. 204, Oct. 7.

AROUND THE GREAT LAKES.

Racine reef beacon light, Lake Michigan, will be raised 20 ft. before the 10th of the present month.

Prospects of good earnings and freedom in the future from even as much competition as has already developed have combined to cause an advance to about $70 a share in the preferred stock of the Great Lakes Towing Co.

Hard coal shipments from Buffalo are, for several reasons, principally the miners' strike, considerably behind previous years. To Oct. 1, 1899, the shipments footed up 398,929 tons, while to the first of the present month the total is only 166,234 tons.

The new ore dock of the Chicago, Milwaukee & St. Paul road at Escanaba will be ready for next year. It is 66 ft. high, has 120 pockets of 250 tons each, is 720 ft. long, with five tracks on the deck, and 6,000,000 feet of timber were used in the construction.

Mr. A. W. Goodrich, president of the Goodrich Transportation Co., Chicago, and Mrs. Goodrich, sailed on the Oceanic, Wednesday, and will go direct to London. Mr. and Mrs. Goodrich will spend some time in Paris and will see the exposition. They will return in December.

The Stang estate of Lorain has sold the dredge Continental, the tug Selah Chamberlain, three mud scows and a fueling scow to the Standard Contracting Co. of Cleveland, for a consideration of $16,600. The sale also includes the transfer of a five years' dredging contract with the city of Cleveland.

During the month of September the United States mail boat in the Detroit river received 12,565 pieces of mail from passing boats and delivered 34,960. The vessel passages numbered 3,004. There were seventy-six money orders issued, their aggregate value being $1,741.61, and twenty letters were registered.

Buffalo harbor will soon have grain elevator capacity aggregating 24,495,000 bushels, of which 9,300,000 bushels, or considerably more than one-third, will be in steel houses. No more wooden elevators are being built. New steel houses that are to add to the capacity of the port are the Sturges, Eastern and Dakota and an addition to the Electric.

A dispatch from Duluth says that the Chandler mine of Vermillion range is shipping enough iron ore to make the season's total 650,000 tons and is employing 550 men; the Pioneer of the same range has shipped 400,000 tons, the Minnesota will make a total of 500,000 tons. There are about 1,700 men working on the range. Wages at these mines are averaging about $2.35 per day, as against $1.65 in 1896 and 50 cents, when there was work for any, in 1893.

The educational department of the Y. M. C. A., Cleveland, proposes to give again this winter a course in naval architecture in connection with the other branches which they teach, such as mechanical drawing, chemistry, steam engineering, structural drafting, etc. Mr. Geo. K. Newbury, one of the draftsmen at the works of the American Ship Building Co., will act as instructor for the course of twenty evening lessons in naval architecture. The lectures will be of a general nature, with individual instructions in special cases. Information regarding this course may be had by addressing Mr. T. T. Long, educational director, Young Men's Christian Association.

In view of the difficulties attending navigation in the vicinity of Pelee passage, Lake Erie, several vessel owners and vessel masters have suggested the removal of Bar point light-ship to Southeast shoal, as it is thought the Bar point vessel might be dispensed with, pending the establishment of a light on Pelee middle ground. Capt. McKay and other officials of the Lake Carriers' Association have had this matter up with the United States light-house board, but nothing can be done on account of Southeast shoal being in Canadian waters. It is hoped, however, that a light on a new crib at the middle ground will be established by the Canadian government in about a week.

Major Clinton B. Sears, United States engineer at Duluth, has called for bids for the removal of the southerly old pier of the Duluth ship-canal, the new one now being practically completed except on the harbor end. The bids will be opened at Major Sears' office Oct. 12, and it is specified that work shall begin as soon as possible this fall and be completed by Feb. 1. The old southerly pier contains considerable material and it will be an undertaking of magnitude to remove it. In the pier are 2,275 cords of rock and 960,000 ft. of timber. The contractor will require the service of a dredge with a tooth dipper to carry on the work. Most of the material will be dumped in the lake at some point to be designated by the engineer in charge. The old pier is 1,218 ft. in length and from 15 to 20 ft. wide. The pier head is from 30 to 40 ft. wide. When the boats begin moving next spring the old pier will have disappeared. The light-houses on the old pier will be transferred to temporary piers, where they will remain until the new steel light-houses are erected early next spring.

The amount of coal which was exported by steamships from the port of Baltimore from Jan. 1 to and including July, was 224,484 tons; and of coke 28,698 tons, which in combined value represented $591,183. No steamship flying the American flag has a representation in this list. The amount of freight paid thereon was $698,310.50. Of the steamships that moved this coal fifty-two sailed under the British flag, fifteen the flag of Norway, two of Austria, two of Germany and one each of the Netherlands, Danish and Italian flags. Surely this presents to the gaze of those who are not initiated into this subject a striking example of the benefits that would accrue to this nation if we were permitted to fly the flag. For the sum mentioned above, paid to the foreign ship owner for the freight, would have under proper legislation remained within the territorial jurisdiction of this country, and not, as an invisible transaction, have found its way to the United Kingdom, and, to a slight extent, the continent.—New York Times.

The North German Lloyd Steamship Co. has awarded the contract for rebuilding the steamship Main to the Newport News Ship Building & Dry Dock Co. The Main was one of the vessels considerably damaged in the conflagration which destroyed the docks of the North German Lloyd line in Hoboken last June. It is estimated that the work of rebuilding the vessel will occupy about one year.

LOSS OF BUOYS IN DETROIT RIVER.

Col. Wm. P. Anderson, chief of engineers, Canadian department of marine and fisheries, makes complaint to Capt. McKay of the Lake Carriers' Association about the loss of buoys near the mouth of the Detroit river on account of the negligence of vessel masters. The Canadian department, as far as their own vessels are concerned, would be justified in discontinuing these buoys altogether, in view of the losses they have sustained. Capt. McKay is therefore trying to devise means whereby the offenders may be made to pay for the damage. Col. Anderson says:

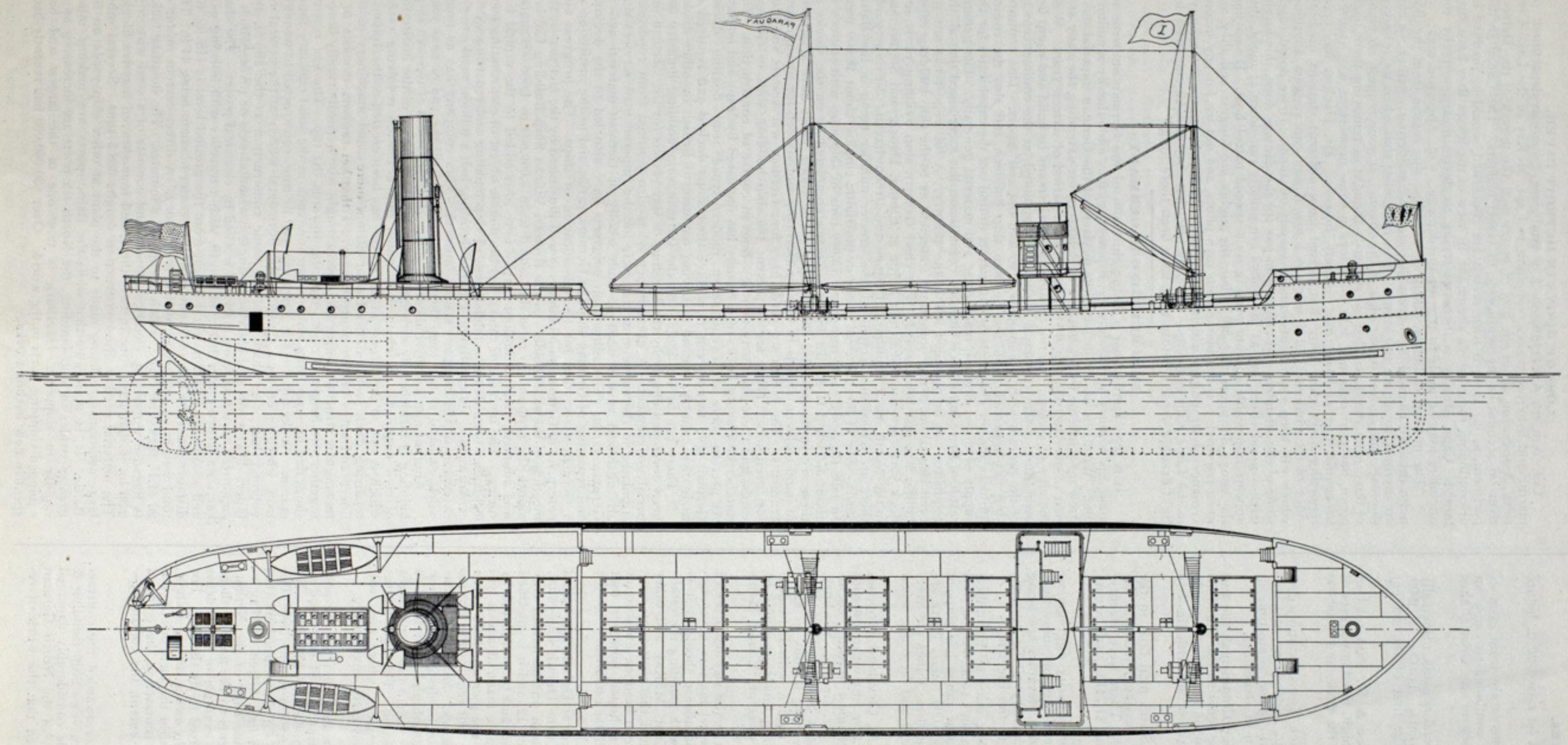
"The number of buoys which we have lost this season from the Bar point dredged channel is so great that we are considering whether we can do anything to reduce the losses. You remember that when we removed the black buoys over to the edge of the channel, at your request, so many of them were run down that we seriously thought of removing them back again, but your influence with the pilots in some mysterious way secured us against further heavy loss. Lately, however, Mr. Hackett has been reporting buoy after buoy disappeared from different stations on both sides of the channel, and I want to know if you can suggest anything which will keep your light-draught vessels off them. If we could catch some of the offenders and make them pay for the damage done, this might have a good effect, but as the buoys are usually run down at night, this appears impossible without putting on a special patrol boat. If you find the buoys disappear this fall, when the nights are longest and they are most required, you can blame your own pilots, and not us, for any inconvenience or strandings which may result. I am putting out three buoys in the Lime-Kiln crossing. I greatly fear that they will be cut down by light-draught vessels before they have been there long."

SHIP BUILDING IN GERMANY.

It is well known that it is the chief aim of the German emperor to make his country a first-class naval power, as it is undoubtedly a military one. With this object in view, the advisers of the German imperial navy drew up a scheme to present to the Reichstag for extending the navy at a cost of over $300,000,000, distributed over a period of sixteen years. With the view of ascertaining the capabilities of Germany to build and equip her own ships of war, the naval authorities appointed, at the commencement of the present year, a commission to find out and report. This commission has approached all the German ship builders, and also the engine builders and the chambers of commerce, to find out the capabilities for the supply of ships, engines, machinery, and material generally. The general result of these inquiries is that the commission has ascertained that all the requisites can be provided within the country. A full report has not yet been issued, but a very important statement as to the ship building capabilities has just been issued. The chief German ship building yards and dock yards are situated in the Baltic at Elbing, Danzig and Stettin, and in the North sea at Hamburg, Bremen and Bremerhaven. In these yards there are 35,000 men employed, the greater number being in the Baltic yards. Six of the principal yards in the Baltic employ about 18,000 men. In 1898 these six yards turned out 75,000 tons of shipping, with engines of about 150,000 I.H.P. In 1899 the vessels completed or on the stocks in these six yards exceeded 360,000 tons. The Baltic yards have at present in hand eighteen vessels of war for Germany and sixteen for foreign governments. The North sea yards have four German war vessels and nine for foreigners. There are at present 106 ship building slips in German yards, and there are thirty-two new ones in course of construction. The number of graving docks in Germany has increased by leaps and bounds. At present there are twenty-seven modern-typed iron floating docks. German ship owners can now have their ships docked and repaired in their own country, instead of having recourse to British or other docks.

There can be no doubt that the German ship building industry has been developed chiefly by the building of war vessels for the German imperial government. A great impetus has also resulted from conditions stipulated in the subvention contracts for the imperial mail services that all subsidized vessels must be built wholly of German material and in German yards. The subvention contracts have also led to the docking and repairing of German ships in German yards, and to the institution of a German association for the classification of ships. The progress and enterprise of German ship builders is well illustrated by the fact that at the meeting of the shareholders of the Bremen Vulcan Ship Building Co. last month the proposal to raise the capital from 3,000,000 to 4,000,000 marks was adopted. Half a million marks were also added to the capital last spring. The increase of capital has the double object of contributing 600,000 francs towards the establishment of ship building and repairing works at Antwerp ("Vulcan Belge") and of devoting half a million marks to the extension of the company's own business. This company has as much work on hand as will keep them well employed till the end of next year.

Another noteworthy indication of the gigantic strides of German shipbuilding is furnished by a recent foreign abstract report of the institution of civil engineers, in which it is stated that a 150-ton revolving crane, which is one of the largest in the world, has been erected at the Imperial repairing dock at Bremerhaven for fitting boilers and machinery to the liners and ships of the imperial navy. The main support consists of a rectangular structure formed by four wrought iron verticals rigidly braced together; its height is 86 ft., tapering towards the top. The feet rest on shoes tied by seven long bolts to anchors sunk in the solid masonry foundation. At the top there is a circular well or ring, constructed of wrought iron, which serves as a guide to the horizontal wheels of the central revolving shaft; this shaft is of the same construction as the above, and tapers downwards and rests on a single horizontal axle or pivot, which is supported on a revolving platform worked by electrical power. The shaft carries a lattice girder 160 ft. in length, with a traveller with hoisting gear and a counterweight; its total height from the ground level is 118 ft., the distance from the face of the quay-wall to center of chain being 44 ft. The total weight of shaft fully loaded is 521 tons. A direct-current motor of 26 H.P. turns the crane, which occupies 7.2 minutes. The hoisting tackle is likewise worked by electrical power, and consists of a steel wire rope 2.36 in. in diameter, rove in two, three, and four-sheaved massive blocks. The material used in the construction weighs 368.5 tons. Several other large additions are being made to the plant at other ship yards on the Baltic. It is noticeable that while the Baltic ports are making much greater strides in ship building, the North sea ports are increasing more rapidly in shipping. Hamburg is now one of the largest and best equipped shipping ports in the world. Over $30,000,000 has recently been spent in new harbor works.

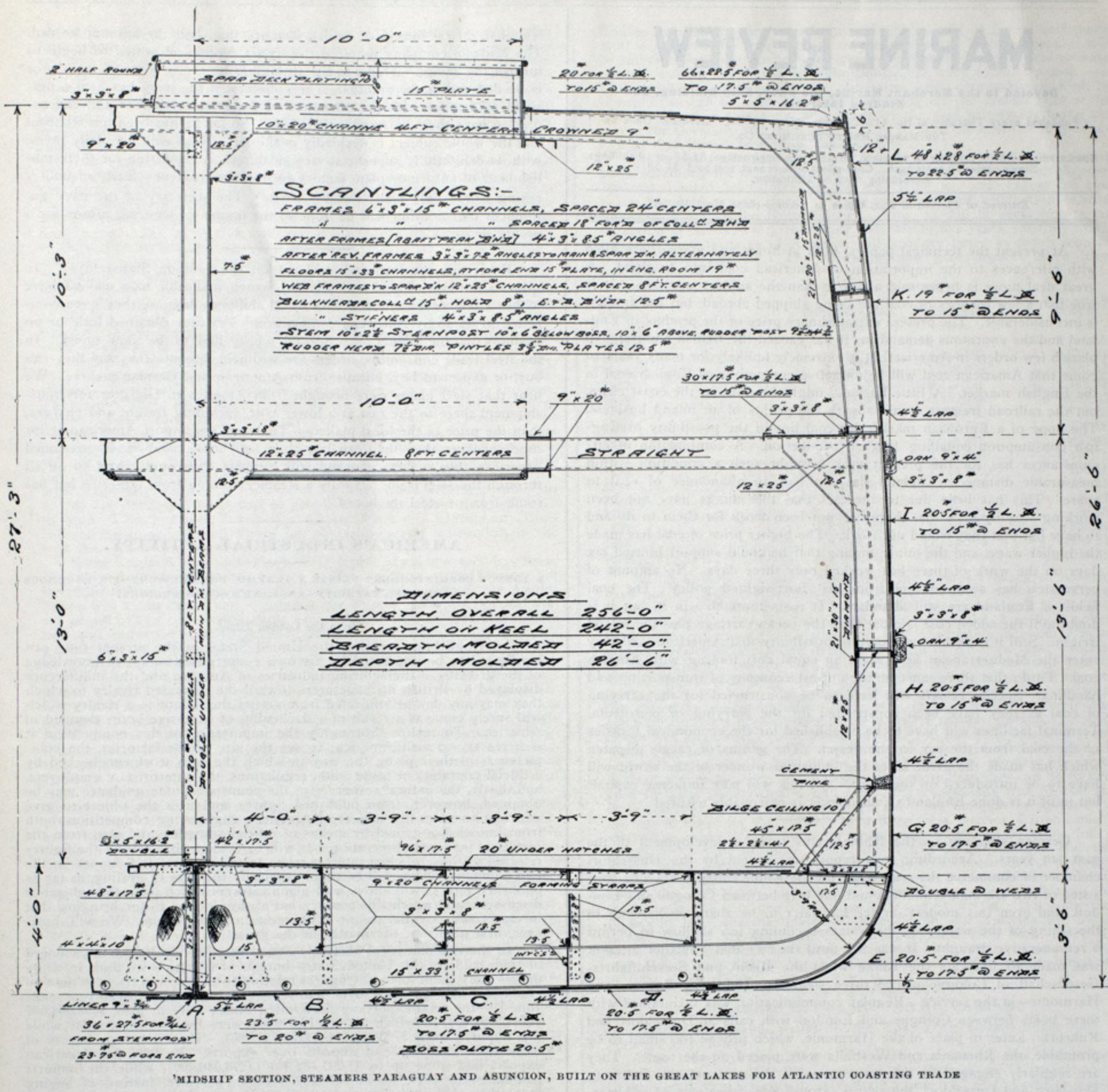


FREIGHT STEAMERS PARAGUAY AND ASUNCION, BUILT ON THE GREAT LAKES FOR ATLANTIC COASTING TRADE.

Ship builders throughout the country, and especially those of the Atlantic coast, will be interested in plans of the kind of vessels that are being built on the great lakes for Atlantic seaboard trade. No doubt the lake builders will be pleased to give consideration to any criticism that may be heard as a result of the publication of these plans. Vessels of Canadian canal dimensions, about 3,000 tons capacity, have gone from the lakes to Atlantic coast cities and more of them will go this fall, on account of the profitable freights that are offered along the seaboard. Most of these vessels have not, however, been of a kind suited to salt-water service. Not so with the steamers Paraguay and Asuncion, plans of which are presented on this and the opposite page. These two steamers, as well as two barges that are being built as consorts for them, are owned by the International Steamship Co., of which Mr. A. B. Wolvin of Duluth, Minn., is manager, and were designed for seaboard trade. All four vessels are being built by the American Ship Building Co., the steamers at the Lorain (Ohio) works of the company and the barges at the West Superior (Wis.) works. The barges are not yet launched, but they will be practically ready to leave the ship yard when launched, and it is expected that they will join the steamers so as to depart for New York early enough to pass through the Welland and St. Lawrence river canals long before there is any thought of closing the canals on account of ice. The Paraguay was launched at Lorain about three weeks ago, and the Asuncion on Saturday last.

In view of the general information as to sizes and weights of plating, frames, scantlings, etc., conveyed by the drawings, it is not necessary as regards hulls to do more than give the dimensions, which are: Length over all, 256 ft.; length of keel, 242 ft.; breadth, molded, 42 ft.; depth, molded, 26 ft. 6 in. Engines are of quadruple expansion type, having cylinders of 15, 23, 35 and 54 in. diameter, with a common stroke of 36 in., and they will be supplied with steam from two Babcock & Wilcox water tube boilers; steam pressure, 250 lbs.

It will be noted that notwithstanding the prejudice that prevails on salt water against locating engines far aft as in lake ships, this practice prevails in the vessels described herewith, and will be followed also in four other steamers for salt water that are being built by the lake ship yard consolidation at Chicago for Charles Counselman and others, but which are not, however, to be finished until next spring. Lake ship builders are quite certain that they can build in competition with Atlantic coast yards a type of vessel that will not be large, of course, on account of the limitation of locks in the Canadian canals, but which will still be large enough to trade at a profit between New York, Boston and Southern ports in the United States, as well as Cuba, Porto Rico and South America. The steamers described herewith will be forerunners in this experiment. Their operation will be watched with special interest, in view of the fact that they are each to tow a barge.



'MIDSHIP SECTION, STEAMERS PARAGUAY AND ASUNCION, BUILT ON THE GREAT LAKES FOR ATLANTIC COASTING TRADE

TORPEDO BOATS WERE NOT SUCCESSFUL.

The war at Newport is at an end. It was at first supposed that the work of the torpedo boats was most successful and that the Holland had sent the big battleship Kearsarge to the bottom of the sea. The board of arbitrament gave out the decision, however, that the big ships were not torpedoed and that the Holland played no part in the proceedings. They say that the only vessels that suffered from the attacks of the torpedo boats were the gunboats Scorpion and Eagle and that they were torpedoed by betraying their position in attacking the tug Leyden, which was sent out as a decoy for that purpose. It was allowed that the torpedo boat Stilletto had torpedoed the Kearsarge. The Stilletto was under fire for one minute, while it requires two minutes to put her out of action. The board says that the Leyden, sent out as a decoy, was almost immediately picked up by the Scorpion and Eagle and put out of action, but that in doing this they betrayed their position and both were soon torpedoed by the little torpedo boat Gwynn. There was no dispute about this and the two gunboats immediately left for Newport. The battleship Indiana was attacked by the torpedo boat Dahlgren, but the board has decided that it was unsuccessful and that the Dahlgren was put out by the Indiana. Owing to a mistake of the umpire on the Dahlgren, not being aware that his boat was no longer in the fight, she attacked the Kearsarge, and while from an attacking point of view it was a success the board did not allow it, as the Dahlgren was already out of it. The battleship Kearsarge was also attacked by the torpedo boats Gywnn, Morris and Porter, but they were all declared to have been put out of action and the attack declared a failure. The Texas was the only vessel that was not found by a torpedo boat and escaped without injury. It was said, however, by those on board the Texas that she had seen a torpedo boat and that after firing a green star, she put to sea with great speed to get out of the way, and did not again come in until the fight was all over. The part played by the Holland was very small, and although much praise is bestowed upon her commanding officer and crew there is no praise for the boat. It is admitted by a member of the board that her test was not fair, and that the conditions were greatly against her, but it could not have been arranged otherwise. The official statement from the board on the Holland is as follows:

"When the Kearsarge was adjudged out of it by the attack of the Dahlgren she turned on her running lights and started for the harbor, considering herself out of the game. While doing this she was attacked by the Holland about five miles outside the Brenton reef light-ship. The board disallowed this, as the Kearsarge was showing her lights, and was not looking out for any more torpedo boats."

The handling of the Holland and the nerve of her commanding officer, Lieut. H. H. Caldwell, who was with Admiral Dewey at Manila, excited great admiration, not only of the members of the board but of all the officers of the fleet, as she was in constant danger of being run over in the darkness by one of the torpedo boats. The opinion of the board is that her crew was most able. There is no praise for the boat as a boat, or any opinion as to her worth to a fleet of torpedo boats in such an attack. The question was much discussed as to whether the blockading squadron should lie without lights, or knowing of an attack by torpedo boats, should have kept searchlights going. Much is to be said on both sides of this question. There is no doubt but there will be a modification of the rules of procedure from the experience gained in this attack and before the next operation of the kind.

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At present the technical papers, both at home and abroad, are filled with references to the importation of American coal into England. A great deal more is being said about it than the subject warrants. It is true that a few cargoes of coal are being shipped abroad, but the amount is inconsiderable. The present extraordinary price of the product in England and the enormous demand for it has caused the British admiralty to place a few orders in America. It is extremely unlikely for many years to come that American coal will be an active competitor of English coal in the English market. A little business might be done in the coast cities, but the railroad freights would absorb the profits of an inland business. The hope of a European market for coal lies in the possibility of English consumption equalling English production. A combination of circumstances has for the present year brought such a condition within measurable distance. England has not had an abundance of coal to spare. This has been due to the fact that the miners have not been working steadily—not that there has not been work for them to do and to have but that they would not work. The higher price of coal has made the higher wage, and the miner finding that he could support himself six days on the work of three has worked only three days. No amount of persuasion has swerved him from his short-sighted policy. The coal fields of England are still abundant. It costs more to win it, but it is doubtful if the added cost is more than the ocean carriage plus the inland freight. Still it is within the range of possibility that American coal may enter the Mediterranean field upon an equal cost footing with English coal. To do that there must be the utmost economy of transporting and handling. Special vessels will have to be constructed for the carrying of coal as they have been constructed for the carrying of petroleum. Terminal facilities will have to be established for the economical transfer of the coal from the car to the vessel. The genius of cargo dispatch which has made the great lakes the industrial wonder of the world will have to be introduced on the coast. All this will take immense capital; but until it is done England's coal market is reasonably assured.

German shipping on the Rhine seems to be a development of the past ten years. According to a report just issued by the Dusseldorf chamber of commerce the only trade on the Rhine thirty years ago consisted of two German schooners and one brig between Cologne and London, and even this modest service had later to be abandoned owing to the silting of the waterway, the waters becoming too shallow to permit a remunerative draught. It was not until the 80's that a further attempt was made to navigate the Rhine when the Rhein und Seeschiffahrts-Gesellschaft of Cologne placed three steamers—Industrie, Energie and Harmonie—in the service. Regular communication was maintained with these boats between Cologne and London with calls at Dusseldorf and Ruhrort. Later in place of the Harmonie, which proved too small to be profitable, the Rhenania and Westfalia were placed on the route. They are regularly engaged in the conveyance of timber from the Baltic to Duisburg and Dusseldorf, the return cargoes consisting of coal and iron. Towards 1890 the Dampfschiffahrts Gesellschaft Neptun of Bremen established a regular service between Bremen and the Lower Rhine and North Sea and Baltic ports up to Riga, and at present this service is carried on by eighteen steamers of from 350 to 900 tons capacity. Several other Bremen companies maintain regular services on the Rhine, and in addition the Vereinigte Bugsir und Frachtschiffahrats-Gesellschaft of Hamburg, which has a fleet of forty lighters, carries on a regular traffic between the Baltic and German Rhine ports. These lighters are seaworthy craft of 600 to 1,100 tons capacity and are towed oversea by powerful tugs. In addition to these company fleets a large number of individual sailing ships now navigate the Rhine.

The armor plate muddle is no nearer a solution today than it was six months ago. All the bids for armor plate were rejected some time ago by the secretary of the navy and new bids solicited. The bids were to have been opened on Tuesday of this week but none of the steel companies submitted any. The armor needed amounts to 36,000 tons for eight battleships, six armored cruisers and three protected cruisers, and constitutes the largest item of the kind ever required by the government. The bids of the Carnegie and Bethlehem companies were identical, each bidding $445 without royalty and $490 with royalty, and each desiring to furnish one-half of the entire amount. The Midvale Steel Co. bid $438 per ton without charge for royalty, but wanted to furnish all the armor or not less than 20,000 tons of it, which is more than half the amount needed. The Midvale company required twenty-six months in which to begin to furnish the armor. This was the stumbling block, as some of the armor is needed within six months. The secretary of the navy has held a personal conference with the managers of the steel companies and endeavored to have them harmonize their bids. So far he has been unsuccessful and the whole subject is decidedly in the air. Meanwhile the daily press, with its delightfully superficial view of things, is clamoring for the establishment of an armor plate factory by the government. Such an undertaking would only make matters worse. The secretary of the navy announces that nothing will be done in the matter of securing armor for a month or so.

Reviewing the iron and steel market the London Statist says: "In spite of the rise of coal and pig the Scotch malleable iron makers have within a few weeks reduced bars by 20 shillings, because they were compelled to do so by American competition. Yet they obtained little or no business by the reduction. Several works had to be shut down. In the steel trade consumers' orders are withheld, because they say they can buy, or expect to buy, cheaper from American and German makers. We hear that steel plates were brought from America to Glasgow for transshipment there to the east at a lower cost, including freight and charges, than the price of the local makers. Tube makers import American strips much cheaper than they can buy them at home, and it is presumed American tube makers can and will compete with ours. And so on all through the steel trade. Hardly a steamer coming from America but has some iron or steel on board."

AMERICA'S INDUSTRIAL ACTIVITY.

A LONDON CORRESPONDENT PAINTS A GRAPHIC PICTURE OF IT—ITS ENORMOUS PRODUCING CAPACITY—ENGLAND'S OCEAN FREIGHT.

From the London Times.

An Englishman visiting the United States at the present time can hardly fail to be impressed by his own countryman's want of knowledge of the growing manufacturing industries of America and the indifference displayed by British manufacturers toward the increased rivalry to which they may any day be subjected from across the Atlantic—a rivalry which will surely come as a result of a slackening of excessive home demand in America. To realize thoroughly the importance of this competition it is necessary to visit America; to see the size of the factories, the completeness of their plant, the way in which the men work, unchecked by artificial restraints or trade union regulations, the enterprise of employers, and, lastly, the natural resources of the country. Some guidance may be obtained, however, from published figures, and it is the object to give information upon the subject of American engineering competition, both from knowledge gained by means of official statistics, and also from the results of personal observation. It will be evident that among the figures referred to those of chief interest relate to the imports and exports of the two countries. That will be more especially the case in dealing, as far as published figures will allow, with manufacturers which form the subject of discussion, and which this country has always looked to for bringing that foreign trade essential to our existence as a great nation. We will, however, first glance at the matter in the gross.

In the two statistical abstracts issued respectively by our own board of trade and by the United States bureau of statistics we find, in more or less convenient form, the figures relating to the foreign trade of the two countries. To go back over ten years—the American fiscal year ends June 30—the total exports of the United States were in 1888, $695,954,507 (£144,990,000), of which about $12,000,000 were for foreign goods; while the imports were $723,957,114 (£150,791,000). That gives an excess of more than $28,000,000 of imports over exports. In 1898 the American exports had gone up to $1,231,482,330 (£276,546,000), while the imports had fallen to $616,049,654 (£128,343,000). Therefore, instead of buying more than they were selling, as in the first named period, the Americans were selling more than they were buying, and that to an enormous extent. Turning to our own figures, we find that in 1888 our total exports were £298,577,541, of which about £64,000,000 were foreign and colonial goods. This may be compared with £144,990,000 for America (dollars being reduced to pounds sterling), so that our exports were double those of the United States in 1888. Our imports for the same year were valued at £387,635,743, as against £150,824,000 for American imports. Our excess of imports over exports was, therefore, more than £89,000,000. Both countries eleven years ago imported more than they exported. By 1898 our exports had fallen to £294,013,988 in value, but our imports had risen to £470,378,583; so that the excess of imports over exports had risen to £176,364,595. It will be seen, therefore, that in this latter year, while we, according to the official figures, bought £176,000,000 worth more than we sold, the Americans sold over £128,000,000 worth more than they bought. This is according to official figures; but in 1898 the value of ships built in the United Kingdom for foreign owners was not recorded. This was certainly not fair to our export trade, as a steamship sold abroad represents considerable industrial activity. In the latest returns this matter has been put on a more satisfactory basis, and we find that for the eleven months ended Nov. 30, 1899, new ships, including machinery, to the value of £8,562,922 were sold for abroad.

Sir Robert Giffen, in his admirable and most timely monograph, read before the Royal Statistical Society, taught us not to be too easily alarmed by an excess of imports over exports, because we had to the good ocean freights and the return on our invested capital in railways, public works, etc., abroad. There are some who go further and say that imports are a sufficient indication of industrial success, for if we did not have the wealth we could not spend it, and the possession of wealth is the measure of material prosperity. It is an easy thing to push an argument like this to

an extreme which would be misleading; but, in any case, it is plain that for a country to carry on an export trade is an indication that it can meet and beat other nations in competition. That is the practical point we have to deal with just now. Moreover, the falling off in American imports—though it may be caused by a protective tariff—is evidence of the nation's greater ability to manufacture for its own needs, and for the consumer to pay the price demanded by the producer, always provided that the people are supplied with the comforts and luxuries of civilization, as the Americans undoubtedly are, and that to a remarkable extent.

It is, perhaps, a little misleading to deal with crude statistics in this wholesale fashion. For instance, to give a just idea of the bulk of business done, it should be stated in terms of the population, for it is evident that, the greater number of people, the less must be their proportionate share of the advantages derived from a given volume of trade. When the figures are looked at in this way, the still existing industrial supremacy of Great Britain is apparent. The American returns for 1898 give "merchandise imported for consumption" at 33s. ($7.89) per head, while our proportion of imports per head of the population is £11 14s. 1d. Turning to exports, we find that the United States sent out of the country in 1898 domestic merchandise to the extent of £3 7s. 9d. ($16.27) per head, of which 70.24 per cent. was agricultural produce and 24.02 per cent. consisted of the products of manufacturers. We exported per head to the value of £5 16s. 2d. for the same year.

Such figures as these, valuable as they are, tell but part of the tale, and are apt, as has been said, to be misleading unless used with discretion. Those who rely wholly on statistics lean too much on the past. They think that, when their tables do not supply instances, instances cannot exist. Such an attitude ignores change and the possibility of change; it is as if Adam had forecast the coming birth rate upon data collected before the fall. That is an attitude the British mind is a little too apt to take. British manufacturers and merchants ought not, therefore, to trust overmuch to "returns." They should visit other countries, more especially America, to see what facilities there are for production in this new land, and what sort of people it is with whom they will have to cope. That, however, is just what they will not do. Hardly any Englishmen go to the United States for observation and instruction in the way that Americans come to Europe.

Since England built up her industrial supremacy a new race has risen. Probably ethnologists do not give it a place in their classifications, but for industrial and economic purposes it is a new race; just as the Anglo-Saxon was a new race when it founded our empire. We in England, who are proud of our relationship with America, are fond of speaking of this new and, industrially, most puissant people (who should really invent a generic title for themselves), as "of the Anglo-Saxon race." This is true so far as that the stiffening of the people comes from Anglo-Saxon ancestry. But the blood has been so blended by crosses from all peoples of the world, and, moreover, the environment of the race during its infancy and later growth has been so different from anything that has attended the progress of any other nation, that the character of the people is sui generis, a race apart, a fact which would be more apparent to Englishmen were it not for the common tongue. The history of our industrial success in the past may interpret much of the present success of America. Our commercial supremacy has been built up largely by foreign immigration. What religious persecution and political oppression abroad did for us in the past, free emigration is doing for America in this present day. It is producing a people so versatile, so farseeing, and so enduring in effort that the very forces of nature seem to take more plastic shape in their nervous hands. If we turn from personnel to material, we find the United States especially favored by nature in the distribution of her gifts. The keystone of a general manufacturing industry is engineering, and this again is founded on pig iron.

For the successful making of pig iron, ore, coal and flux are needed; and it used to be commonly said that the engineering supremacy of Great Britain would never be threatened because of her natural advantages—ironstone, coal and limestone near together, and all close to the sea. Other countries, we used to say, might have one or the other, but more or less widely distributed, and not near a port. In 1874 Mr. A. L. Steavenson of Durham said, at a meeting of the Iron and Steel Institute, when speaking of the great Cleveland iron district, "rival claims to be the leader in producing iron have been made, but we have seen nothing yet in any of these to cause the least anxiety." So far as knowledge went there was truth in this, but prospectors, inventors and others have brought things about that have changed the situation. Our coal has been getting deeper and more difficult to win. Much of our ore has been worked out, or is found to be unsuited for modern processes. On the other hand, in foreign lands richer ores have been found and worked. The Lake Superior ores contain from 50 per cent. to 65 per cent. of iron, while the Gellivara mines of northern Sweden give a 69.51 per cent. ore. Even our rich Cumberland and Lancashire hematite ores have but 57.60 per cent. of iron, while the Cleveland ironstone is very much leaner. Abroad, again, coal is being worked nearer the surface, and, where long distances have to be covered to bring the materials together at the blast furnace, improved engineering practice and commercial enterprise have enabled our foreign competitors to overcome what seemed formerly insurmountable obstacles. This is particularly true of America, as will hereafter appear.

So far from our own coal, ironstone and flux being together, nearly the whole of the ore for a most important make of iron, i. e., that used in the manufacture of Bessemer steel or mild steel—is brought a thousand miles over sea from Spain. Thus, in 1898, there were produced in the United Kingdom 8,631,151 tons of pig iron of all kinds, and during the same year we imported close upon 5,500,000 tons of ore, chiefly from Spain. The reason of this shifting of our field of supply to a distance is, of course, well known. It is that the greater part of our native ores contain too much phosphorus for producing iron suitable for the manufacture of Bessemer and Siemens steel by what is known as the acid process; and, as yet, the acid process is the one preferred in Great Britain. Figures bearing on this will be given later in these articles. It is hardly necessary here to dwell on the supreme importance of steel of the descriptions named in modern engineering construction. Mr. Andrew Carnegie has recently said that "the city or the nation that can produce the cheapest ton of steel has insured supremacy; the cost of so many other articles depends on the cost of this prime element." Mr. Carnegie is himself, above all, a steelmaker, but that does not make his statement less true. For the ore from which this valuable material is made we in England are chiefly dependent upon foreign mines, so far as acid-made steel is concerned. In regard to the more modern basic process, it will be sufficient for the present to say generally that the original acid process of steel making demands a non-phosphoric ore, such as the Spanish ore, while, with a basic-lined furnace, our native ores, comparatively high in phosphorus, can be used. In spite of this, by far the greater part of the steel produced in this country is made by the acid process, it being reserved for Germany and the United States to take the lead in the production of that British invention, basic steel.

Up to about ten years ago Great Britain had always held the premier position among the iron-producing countries of the world, but in the year 1890 the United States wrested the lead from us, and, except for two years, has held it ever since. Fifteen years ago our production of iron was double that of the United States. Now, as will be seen, we are far behind; and there is every indication that within five years, possibly much less, the blast furnaces of America will produce twice as much iron as those of Great Britain. The following table gives figures taken from official sources:

PRODUCTION OF PIG IRON.

YEAR.	United Kingdom. Tons.	United States. Tons.	+ or —U. K. to U. S. Tons.
1884	7,811,627	4,097,869	+ 3,713,858
1885	7,415,469	4,044,526	+ 3,370,943
1886	7,009,754	5,683,329	+ 1,326,425
1887	7,559,518	6,417,148	+ 1,142,370
1888	7,998,969	6,489,738	+ 1,509,231
1889	8,322,824	7,603,642	+ 719,182
1890	7,904,214	9,202,703	— 1,298,489
1891	7,406,064	8,279,870	— 873,806
1892	6,709,255	9,157,000	— 2,447,745
1893	6,976,990	7,124,502	— 148,512
1894	7,427,342	6,657,388	+ 769,954
1895	7,703,459	9,446,308	— 1,742,849
1896	8,659,681	8,623,127	+ 36,554
1897	8,796,765	9,652,680	— 856,213
1898	8,609,719	11,773,934	— 3,164,215
1899	9,305,319	13,620,703	— 4,315.384

So far as domestic use is concerned the figures relating to America need not touch British ironmasters very closely, for we long ago ceased to look on the United States as a market for our iron, owing to the protective tariff which forms so prominent a feature of American policy. With an ever-growing population and such vast tracts of country being rapidly developed, the home demand for iron in America must continue to be enormous, and so long as production does not outstrip demand British makers may look on this growth with indifference, knowing they neither gain nor lose. The case will be entirely different, however, when the American makers produce more iron than is needed in their own country, and, as a consequence, have to seek a market abroad. To some extent this has already come about, for pig iron has been sent to Europe, while iron and steel in their manufactured state have also been largely exported from the United States. At the present moment, however, American manufacturers of all classes have more than they can do to keep pace with the home demand, and this is more especially true of iron and steel makers. During a tour through the chief manufacturing states of the union, made for the purpose of writing these articles, I found everywhere the same tale of booming prosperity, works of all kinds full of orders for a year or more ahead; old works being enlarged and new works being started. Never anywhere has there been such a period of commercial expansion since the factory system was established. Naturally in this way supply and demand act and react on each other, so that the ball may be kept merrily rolling for a long time yet. But some day, sooner or later, the inevitable will come about and America will awake to the fact that she has more blast furnaces, more steel mills, more factories of all kinds than the country demands for its existing needs. That is an old, old tale with us; for the ebb and flow of trade seems as inevitable as tides to an ocean.

CHARLES H. CRAMP ON THE VARIAG.

Charles H. Cramp writes to the New York Herald under date of Sept. 20 as follows:

"The Herald of Sept. 20 contains a dispatch stating that 'orders have been received from St. Petersburg by the Russian naval inspectors at Cramps' ship yard which will necessitate a new trial by the cruiser Variag before her formal acceptance by the Russian government, etc.' It is further alleged that 'it was not expected that a new trial would be demanded.' No such orders have been received from St. Petersburg by the Russian naval inspectors here. Further, the statement that 'it was not expected that a new trial will be demanded' has no foundation whatever. Our contract with the Russian government requires the Variag to develop a speed of 23 knots an hour for 12 hours under natural draft and other conditions clearly set forth in the contract. She developed considerably more than 23 knots an hour for 7½ hours, when the trial was interrupted by an accident. Therefore the contract requirement as to speed had not been complied with. There never was on our part the slightest intention to ask the Russian government to accept the ship under the conditions above set forth. There never was an intimation on the part of the Russian board of inspection that their government would accept the ship on that basis. If they had offered to accept her on that basis we would not have entertained that offer. We do not deliver ships to any customer, public or private, on conditions involving any relief or mitigation of the conditions of the contract."

National convention of the Christian church at Kansas City—For this occasion the Nickel Plate road will sell excursion tickets on Oct. 10, 12 and 14, at one fare plus $2.00 for the round trip, good returning until Oct. 21 on any one of our peerless trio of daily express trains, where scheduled to stop. Individual club meals are served in all dining cars at prices ranging from 35 cents to $1.00. Secure sleeping car reservations in advance. Write, wire, 'phone or call on nearest agent, C. A. Asterlin, T. P. A., Ft. Wayne Ind., or E. A. Akers, C. P. & T. A., Cleveland, O.
Oct. 14, 219.

EIGHT HUNDRED VOYAGES

AND 700,000 KNOTS WITH WATER TUBE BOILERS OF THE BABCOCK & WILCOX TYPE—EXPERIENCE OF THE WILSON LINE.

The Engineer of London, a radical opponent of the course of the British admiralty in the matter of water tube boilers, and one of the English trade journals that probably had much to do with the recent disturbance on this subject in parliament, contains the following very interesting account of the experience of the Wilson line with water tube boilers of the Babcock & Wilcox kind:

"Some twenty years ago one of the big Birkenhead and Liverpool ferryboats was fitted with Babcock & Wilcox boilers, instead of the Scotch boilers which had previously supplied steam. The water tube boilers worked very well, and gave no trouble; they had but one defect, they could not make as much steam as would satisfy the minimum requirements of the traffic. When they were pressed to do more they wept over their hard fate. In other words, they primed copiously. They were taken out of the boat after a few months service. The experiment did a great deal of harm, because it ruined the reputation of the water tube boiler for marine purposes. In the pages of this journal we have over and over again stated that the water tube boiler will not stand forcing. If it is to be used with comfort it must be treated gently. Of course it will be understood that we speak now only of the large tube boiler, and are not referring in any way to the express boiler, which can be worked within an inch of its life without priming or giving trouble, simply because it is specially designed to make an enormous quantity of steam in the shortest possible time. A water tube boiler with large diameter tubes can be designed which will do all that the express boiler will do. But it probably would not pay to make such a boiler, which would be different in the details of construction and the method of putting it together from most of the boilers now before the public. It ought, indeed, to be borne in mind that firms making water tube boilers in numbers must perforce adopt certain systems of construction which satisfy commercial needs. Thus, for example, if cast iron "headers" are used, they ought to be of such a form that they can be machine molded, and in any boiler they will all be precisely alike, although it would be better for the boiler if they differed. Again, when steel stampings are used, care must be taken to use shapes which can easily be pressed or stamped, will not crack, and will need very little fitting or preparation after they come out of the stamping press. Again, the exigencies of the furnace builder must be considered. He cannot do everything with fire-bricks. And so it happens that what we may term a commercial water tube boiler is, after all, a compromise, and must be treated in a fair give-and-take spirit.

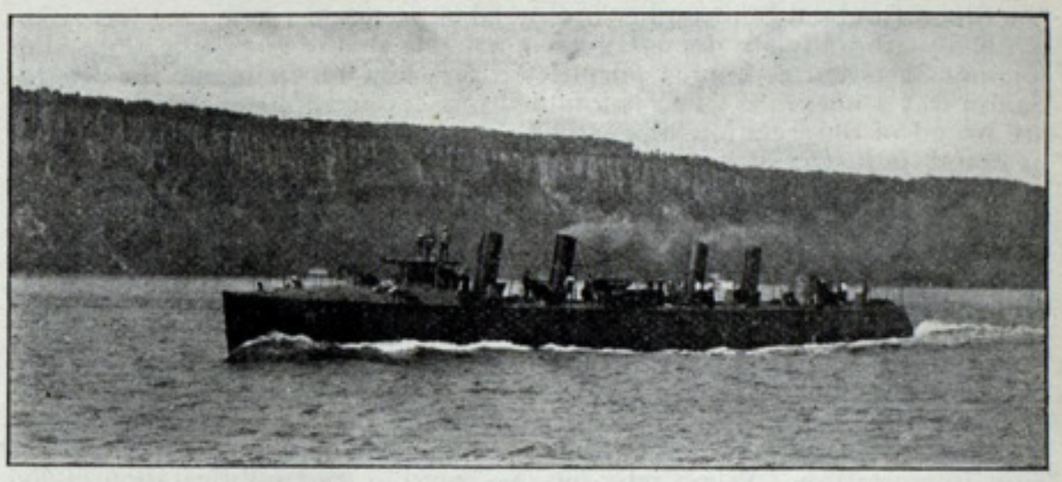
"Recently energetic attempts have been made to introduce a water tube boiler of some kind into merchant ships. Various trials have taken place, and at last, after not a few failures, it would appear that the Babcock & Wilcox boiler has got a firm footing in the mercantile marine. In the course of the recent house of commons debate on the naval estimates, Mr. C. H. Wilson of Hull, supplied some information which has not received half the attention it deserves. It took the form of a brief history of the proceedings of Mr. Wilson's firm in fitting water tube boilers to the ships of the celebrated Wilson line. About eight years ago Babcock & Wilcox boilers were put on board the Nero, and have been at work ever since. Up to July 17 she had steamed, Mr. Wilson told the house, 166,000 knots. In 1895 a new steamer, the Hero, was fitted with similar boilers, and steamed 131,000 knots. In 1896 the old cylindrical boilers were taken out of another steamer and replaced by water tube boilers. She has made 104 voyages, and run 106,293 knots. In 1897 the same thing was done with the Orlando, which has made sixty-eight voyages, and run 84,306 knots. In 1898 the old cylindrical boilers were taken out of the Rollo, and water tube boilers substituted, and she has made forty-nine voyages, and run 53,975 knots. In 1898 the Otto was built for the short weekly continental trade, and was fitted with water tube boilers. She has made ninety-nine voyages, and run 51,984 knots. In the same year the Truro, a new vessel, was fitted with water tube boilers. She has made ninety-four voyages, and run 51,291 knots. In 1899 the cylindrical boilers were taken out of the Tasso, and water tube boilers put in. She has made twenty-seven voyages and run 44,046 knots. This steamer makes frequent voyages from Hull to the west coast of Norway. Summing up the results, we find the ships have made 800 voyages, and run 700,000 knots, and have given very little trouble. This is a record with which, we think, any maker of water tube boilers may be well satisfied. The great advantage secured has been the saving in weight. In one of the Wilson liners, for example, the water tube boilers and water in them weighs 50 tons less than Scotch boilers of the same power and the water in them.

"Mr. Wilson's experience is so far unusual that we have taken some pains to ascertain to what his success was due. In reply to our inquiries, Mr. Wilson and the superintending engineer of the line, Mr. H. S. Hide, have courteously supplied us with information of great interest. It will be remembered that we have stated that the water tube boiler will not stand forcing. Now, in the Wilson boats the boilers are never forced. This is the key of the puzzle, the solution of what has in some quarters been looked on as a mystery. Ample boiler power is provided, and the boilers can, so to speak, take their own time. The Scotch marine boiler supplying triple expansion engines will develop about 1 I.H.P. for 3 sq. ft. of total heating surface, and 11 I.H.P. per square foot of grate. Of course higher and lower results are common enough, but the figures we have given represent a good average performance. Now the water tube boilers in the Wilson line have nearly double this amount of heating surface. Thus, for example, the Nero has 5 sq. ft. of heating surface per 1 H. P. The Hero has 4.4 sq .ft.; the Cameo and Orlando, with a surface of 4.4 sq. ft. and 4.5 sq. ft., have given more trouble than any of the others, because, we are told, they were originally made too small for their work. If space were available the surface ought to be 6 sq. ft. per horse power. The Martello is the most economical of all the ships. Mr. Hide tells us that any attempt to obtain more than 1 H. P. from 5 sq. ft. of surface, or to burn more than 18 lbs. of coal per foot of grate per hour, has been attended with loss of economy and trouble with the tubes next the fire. There are no fewer than nine large steamers of the Wilson line now doing well with Babcock & Wilcox boilers. The lesson they teach is eminently satisfactory to us, because it confirms in the fullest way statements which, as we have said, we have repeatedly made, and which, we may add, have angered not a little more than one advocate of the water tube boiler.

"The truth is that the water tube boiler, like every other boiler, has its limitations. Unfortunately this truth is put on one side. The admiralty put it on one side. They attempted to get out of the Scotch boiler a duty of which it was wholly incapable. The result was total failure. Not because the boiler is a bad one, but because its limits were not recognized. It has been and is still almost impossible to persuade the water tube boiler men that the limits of each and every type are very rigidly fixed indeed. The enthusiasm of inventors has carried them away. They have persuaded steam users that their boilers could do what was really impossible. The result has been failure, and the ruin of the reputation of the boiler. It is the old story—reason disappears in a mist of verbosity. The water tube man persuades himself, and would persuade the world if he could, that a foot of heating surface in his boiler is at least as good as a foot in any other boiler. It is nothing of the kind. The water tube boiler is a very excellent steam generator, but to make the most of it we must fully understand, not what it can do, but what it cannot do. Even when it is as big as it must be, Mr. Wilson's experience shows that it is better than the Scotch boiler—as much as £1,500 to £2,000 a year better in one ship, according to Mr. Wilson's figures. He is content to save 50 tons; the indiscriminate advocate of the system would save 100 tons, with the result that the boilers would be turned out of the ship in six months. The water tube system has suffered infinitely more from its friends than from its enemies."

IMPROVEMENTS AT CHARLESTOWN NAVY YARD.

The boat shop at the Charlestown navy yard has at present a force of seventy-two men working on about thirty-five boats of all classes. Never before was the shop so busy. This condition is due to the fact that the boats turned out at the Charlestown yard are among the best in point of workmanship of any produced in the country, and they cost less —quality considered. Two years ago the Charlestown boat shop employed only a few men and was of comparatively little importance. Now all this is changed. Even the present big building is not roomy enough to accommodate the growing needs, and a fine new three-story boat shop



Torpedo boat Bailey, built by the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, New York, made 30 knots on her preliminary trial trip.

is among the recommendations made by Admiral Sampson in his estimates for the ensuing year. This structure will be erected alongside the new dry dock next the water front. The upper story is designed for use as the room where the new work will be done, the second story for the painting and finishing department, and the lower story for the repair work.

In the shop workmen are laying down two 28-ft. cutters and four whaleboats for the new cruiser Des Moines; a 28-ft. whaleboat, two 26-ft. cutters, two 28-ft. cutters, two 30-ft. cutters, a 33-ft. steam cutter and a 30-ft. barge for the cruiser Olympia; a 14-ft. dinghy and a 28-ft. whaleboat for the dynamite cruiser Vesuvius; two 30-ft. launches, six 20-ft. cutters for torpedo boats, a 33-ft. steam cutter for issue, and two 30-ft. steam cutters. Repairs are being made on a 28-ft. cutter, a 26-ft. cutter, a 28-ft. steam launch and a 30-ft. steam cutter from the dispatch boat Dolphin. A 30-ft. steam cutter and a 28-ft. gig whaleboat are being built; the former for the Dolphin and the latter for the Des Moines.

Nearly $5,000 worth of new tools and appliances have been added to the shop's outfit lately, and another costly machine is to be set up soon. The new machinery includes a 40-in. planer, an upright drill for brass work, a power hack saw, a rip-up-timber and dimension saw, emery grinder, three grindstones. The machine still to be added, and which will cost more than any of those already in place, is known as a boat timber bending machine, and is for bending the timbers which are used in the construction of small boats.

LENGHTENING THE ERMACK.

It was decided recently to lengthen the ice-breaker Ermack, built in England two years ago for the Russian government, and to alter the form of the bow, which entailed cutting off the existing bow and building a new one to take its place. The first stage of the operation has been practically completed, and the Ermack has at present as much of the original material cut away as it is possible to do without, before putting the vessel in dry dock. The second stage, that of launching the new bow (which is to take the place of the old one), was successfully carried out recently by Sir W. G. Armstrong, Whitworth & Co. at Walker. The form of the structure is such that without extraneous buoyancy there would be an absence of sufficient stability to maintain an upright position, and to obviate this a large steel pontoon was built and securely riveted to the sides of the bow. Ballast was carefully placed so as prevent any tendency of the bow to tip during the launching, and special precautions in the way of shoring and timbering were carried out. The curious-looking structure went in the water without the slightest difficulty, and floated within an inch of the calculated draught. The length of the new bow is 75 ft., and the launching weight was nearly 500 tons.

INCREASE IN FOREIGN NAVAL STRENGTH.

"Notes on Naval Progress," for 1900, just published under the direction of Capt. C. D. Sigsbee, chief intelligence officer of the navy, embrace the usual comprehensive range of subjects concerning the navies of the world. Of the six topics treated nearly all are technical. Lieut. C. C. Marsh writes of ships and torpedo boats; Lieut. Com. R. T. Mulligan of gunnery, ordnance and armor; Lieut. L. R. de Steigner of engineering and electricity, and Lieut. W. L. Howard presents some tables of comparison of the principal naval powers. The principal article is by Lieut Howard. It is entitled "Increase in Naval Strength as Shown by Naval Budgets," and deals minutely with the preparations made by the several naval powers to augment their fleets. In his introduction Lieut. Howard says:

"England, as usual, leads with the largest sum for the support and increase of her navy. But large as is this total it is generally felt that the admiralty program is inadequate, and the press of that country is actively urging a further increase. The British program proposes to lay down this year the following vessels: Two battleships, six first-class armored cruisers, one second-class cruiser, two sloops, two gunboats and two torpedo boats. With these the number of vessels under construction in 1900 are seventeen battleships, twenty armored cruisers, one first-class protected cruiser, two second-class protected cruisers, one third-class cruiser, eight sloops, four torpedo boats, twenty-one destroyers and one royal yacht. There has never been so many vessels under construction as at the present time. In 1899 England added nineteen vessels to her fleet, aggregating 122,322 tons, and in 1898, thirty ships with a total tonnage of 140,988. The budget for this year provides for an increase of 4,240 in the personnel, bringing the total strength up to 114,880 officers and men.

'In addition to the French ship building program of 1896, which covered a period extending to 1907 and provided for the constructing of 220 vessels, the French minister of marine now proposes the construction of a number of vessels of various kinds necessary to make the fleet a homogeneous force. The program proposes laying down the following vessels, beginning this year: Six battleships, five armored cruisers, twenty-eight destroyers, 112 torpedo boats and twenty-six submarine torpedo boats. This will give the French fleet, after the execution of the program, twenty-eight battleships, twenty-four armored cruisers, fifty-two destroyers, 263 torpedo boats and thirty-eight submarine boats. The total cost of the old and additional programs will be 712,208,000 francs."

Considerable space is devoted to the increase in the German navy on account of Germany's decision to become a great naval power. In addition to the program of increase provided for in 1898 it is now proposed to make a further increase. There is considerable opposition to the bill to carry into effect the new proposals, but Lieut. Howard points out that even if the proposed program should be closely adhered to Germany's fleet would appear in the following years thus:

1900—Seventeen battleships, ten large cruisers, twenty-nine small cruisers, twelve divisions of torpedo boats.

1908—Twenty-nine battleships, twenty large cruisers, fifty-one small cruisers, sixteen divisions of torpedo boats.

1916—Thirty-eight battleships, twenty large cruisers, forty-five small cruisers, sixteen divisions of torpedo boats.

Italy's naval budget for 1900-1901 amounts to 122,174,671 lire. An annual extraordinary expense of 10,000,000 lire has been authorized for ship building for the period ending in 1903. Italy has on the stocks or in a more or less advanced state of construction the following ships: Four first-class battleships, three armored cruisers, three small cruisers, ten torpedo boat destroyers and three first-class torpedo boats. To these must be added two first-class battleships of Admiral Bettolo's naval program.

All the 117 warships provided by the Japanese naval program of 1895 have been completed or are in process of construction, and Lieut. Howard says it is probable that a new program will shortly be decided. The budget for 1900 amounts to 46,946,193 yen, and there is a special fund for the maintenance of vessels authorized by the diet of 1898-99.

Russia has followed the example of the European powers in formulating a program of new construction. In 1898 a sum of 90,000,000 roubles was set apart for the completion in six years, ready for sea, of ten armored cruisers, ten second class cruisers and twenty destroyers. This program was in addition to the annual program outlined by the naval estimates. Later the number of vessels to be built was changed to eight battleships, eight large cruisers and twenty destroyers. In concluding his review of Russian naval progress Lieut. Howard says: "Notwithstanding the fact that the progress made with existing programs has not been as rapid as was expected, and that her naval budget has steadily increased from $29,000,000 in 1897 to $45,000,000 in 1900 it is currently reported that the Russian government has in preparation and will shortly announce a new and extensive program for the increase of her fleet."

By a royal decree of May 28, 1900, Spain has provided for getting rid of the useless warships and with the proceeds of their sale two ships of about 2,000 tons each, to be used for training officers and men, are to be constructed. The credits allowed under the budget for this year are to be employed "toward completing and increasing the crews of the Pilago, Carlos V., Numancia, Victoria and Nautilus." A general scheme of instruction for officers and men is to be carried out. The Austrian naval estimates for 1901 provide for the completion of vessels under construction but not for any new ships. Denmark's naval budget is to be used partly to pay the first credit for the construction of a new battleship of the type of the Herluf-Trolle, recently launched. Holland's program for this year proposes four large battleships, two smaller battleships for interior waters, three monitors, fourteen gunboats, twenty-one sea-going torpedo boats and twelve smaller torpedo boats. This program is to be completed in 1909. Sweden is to build three first-class battleships and to modernize three coast defense battleships.

George C. Shepard, who had considerable experience in different lines of marine engineering on the great lakes and at the works of the Cramps, Philadelphia, after an education in that special line at Cornell university, has lately risen to chief engine draftsman in the marine department of the Maryland Steel Co., Sparrow's Point, Md.

An addition is to be built to the works of the Hilles & Jones Co. of Wilmington, Del., manufacturers of ship yard tools.

FIRST ATLANTIC VOYAGE OF SAVANNAH.

Mrs. Emma H. Adams of East Berlin, Conn., has in her possession an ancient manuscript which contains an account of the first Atlantic voyage of the Savannah, built in New York in 1818. She is a granddaughter of Capt. Moses Rogers, the commander of the Savannah. The story of the manuscript follows:

The first Atlantic steamship, Savannah, was built in New York, under the direction of Capt. Moses Rogers, in the year 1818, by Ficket & Crocket. The engine was built by Daniel Todd of Elizabethtown, N. J., and Stephen Vail of Morristown, N. J. The engine was taken on board at Elizabethtown, whence the ship returned to New York. On March 29, 1819, she sailed from New York for Savannah, Ga., where her joint owners resided. She sailed from Savannah to Charlestown, S. C., with the president of the United States, James Monroe, on board. After successful experiments she sailed May 25 for Liverpool. She was a full-rigged ship of 350 tons burden, with a low-pressure engine of 90 H.P. She was a fast sailer, and by the power of her engine she would go eight miles per hour. She was commanded by Capt. Moses Rogers of New London, Conn., and Capt. Stephen Rogers of New London, Conn., was her sailing master. She arrived safely in Liverpool after twenty-two days, fourteen of which she used her engine. She was seen from the telegraph station at Cape Clear, the southern part of Ireland, and reported as a ship on fire. The admiral, who lay at the cove of Cork, dispatched one of the king's cutters to her relief; but great was their astonishment at their inability, with all sail, in a fast vessel, to come up with a ship under bare poles. After several shots had been fired from the cutter the engine was stopped and the surprise of the crew at the mistake they had made, as well as their curiosity to see the singular Yankee craft, can be easily imagined. They asked permission to go on board, and were much gratified by the inspection of this naval novelty.

On approaching Liverpool hundreds of people came off in boats to see her. She was compelled to lay outside of the bar till the tide should serve for her to go in. During this time she had her colors all flying, when a boat from a British sloop of war came alongside and hailed. The sailing master was on deck at the time and answered the officer of the boat.

"Where is your master?" the officer inquired.

"I have no master, sir!"

"Where is your captain, then?"

"He is below; do you wish to see him?"

"I do, sir."

Capt. Rogers, on being called, asked him what he wanted, to which the officer replied:

"Why do you wave that pennant, sir?"

"Because my county allows me to, sir."

"My commander thinks it was done to insult him, and if you do not take it down he will send a force that will do it."

Capt. Rogers then called to the engineer: "Get the hot water engine ready!"

Although there was no such machine on board it had the desired effect, and Johnny Bull paddled off as speedily as possible. On approaching the city the shipping piers and roofs of the houses were thronged with persons, cheering the adventurous craft. Several naval officers, noblemen and merchants from London came down to visit her, and were curious to ascertain her speed, destination, etc. As it was soon after Jerome Bonaparte had offered a large reward to any one who should succeed in taking his brother, Napoleon, from St. Helena, it was suspected that this was the true object of the Savannah. After twenty days in Liverpool, during which time she was visited by thousands of persons of rank and her officers were treated with marked attention, she left for Copenhagen, at which place she arrived safely, and there excited similar curiosity. She proceeded from there to Stockholm, where she was visited by the royal family, foreign ministers, naval officers, nobility and others, who, by the invitation of Mr. Hughes (the American minister) dined on board and took an excursion to the neighboring islands. Lord Lyndock of England, who was then on a tour through the north of Europe, by invitation of our minister took passage on board the Savannah for St. Petersburg, in Russia. There she was boarded by several noblemen and military officers, who tested her superior qualities by a trip to Cronstadt. Valuable pieces of silverware were presented to her officers. She sailed from St. Petersburg to Copenhagen, and from there to Arendal, in Norway. She sailed from there back to Savannah, where she arrived safely after a passage of twenty-five days, thus performing a voyage highly creditable to American ingenuity and enterprise.

PRACTICAL USE OF WIRELESS TELEGRAPHY.

The stranding of the Russian ironclad Générale Amiral d'Apraxine, last winter, led to an interesting application of wireless telegraphy. The ship struck on the rocks off the coast of the island of Hohland, in the Gulf of Finland, and to render the salvage possible at that season it was necessary to find some means of establishing telegraphic communication with the mainland and with the ice-breaking steamer Ermack. A vertical wire, a transmitter, and a coherer were accordingly erected on the island of Hohland, and a similar plant on a small islet near Kotka, the distance between the two stations being 33 miles. The vertical wires used were 157 ft. high, and the induction coils for the transmitter could give sparks 14 in. long. The apparatus worked perfectly, and one of the earliest uses to which it was put was to the rescue of a group of twenty-seven fishermen who were carried away on a floe. Owing to the timely use of the wireless telegraph notice reached the Ermack in time for this boat to save the whole of the men. In all, the apparatus was operated for a period of eighty-four days, during which time 440 official telegrams were despatched and received. During two days the working was stopped by storms, in what way we are unable to say, since the account on which our note is based does not explain the matter. It is, however, stated that, if anything, the working was better during a heavy snow storm than in finer weather.

During the gale which blew off the Atlantic last week the White Star liner Oceanic lost one blade off her port propeller. The loss of the blade, however, made little difference in the speed of the ship.

Percy & Small, Bath, Me., have received from the Mallory Steamship Co., New York, the sum of $49,250 for the loss of the schooner Charles P. Notham.

"THE MONITOR AND THE NAVY UNDER STEAM."

In this work by Frank M. Bennett, lieutenant, U. S. N., written, as the preface states, "as a history of the origin, career and influence of the United States ironclad steamer Monitor," Lieut. Bennett has brought together a great deal of matter, interesting in itself, but doubly so from the clear and orderly manner in which it is presented. Treating the Monitor as an epoch maker, standing midway between the wooden sailing ship and the steel armored steam battleship, he shows the conditions theretofore obtaining, the progressive development and application of steam as a motive power in the propulsion of ships, making the Monitor possible, and thereafter, the modern battleship. Without detracting from the Monitor's achievement at Hampton Roads, the author is cautious not to ascribe too great results from this as a specific cause, but, and we believe properly, treats the battleship as the natural product of forces at work before the building of the Monitor and her memorable encounter with the Merrimac, although greatly hastened thereby.

The beginning of steam navigation and its first use in navies, the invention and application of screw propellers, the influence of shell guns and the question of armor, beginning of armored ship building in the United States, consideration of the various types of armored craft, the duel of the Kearsarge and Alabama, the entrance of Farragut into Mobile bay, the passage of Vicksburg, and many other subjects are discussed. Considerable space is devoted to the war with Spain, amounting to a history of the operation of the navy during that period. The work is not technical, but in a clear and intelligible manner presents the growth of steam war vessels from their beginning to the splendid battleships now building. The Monitor is the prototype of these.

The ship-of-the-line, perfect and all-powerful of its class at the opening of the nineteenth century, has vanished, and the century closes with steam and steel "as the true emblems of naval power." As one considers the steady developement of the naval architect's work, the use of steel and the application of steam, his respect for the "man behind the guns" does not lessen. One cannot, however, but be impressed with the notion that the "man at the furnace door" is almost as important.

Published by Houghton, Mifflin & Co., Boston and New York, 1900.

PNEUMATIC TOOLS IN EUROPE.

The use of pneumatic tools in Europe has increased marvelously within the last year, and has grown far beyond the expectations of the most sanguine mauufacturers of this class of machinery, the monthly average of one concern in this line reaching 300 shipments or ten per day. Exhibits of pneumatic tools at the Paris exposition attracted more attention than any other special line, the appliances having been adapted to so varied a line of work as to be entirely novel. Their usage ranged from heavy drilling in armor plate to the lightest carving in stone or the drilling and sawing wood. The hammers range in power from the minimum to the driving of 1¼-in. rivets in the hulls of vessels. As a result of these exhibits two gold medals (the highest award) were awarded to one American concern—the Chicago Pneumatic Tool Co. Other American concerns also received awards—silver and bronze medals. The Chicago Pneumatic Tool Co. had two exhibits. One of these, within one of the exhibition buildings, consisted of the company's various tools adapted to general usage, and all in full operation. The outside exhibit consisted of a section of a vessel in course of construction, showing the various tools in use on such work, riveting, chipping plates, drilling, etc.

Mr. J. W. Duntley, president of the Chicago Pneumatic Co., who returned last week, is enthusiastic over the reception accorded the exhibits of the American companies, and anticipates a very bright future for pneumatic tools in foreign countries. The foreign ship builders realize that as these tools have revolutionized ship building, boiler making, locomotive building, car building, and the like in America, they must use them in order to compete with Americans in the markets of the world. One foreign corporation, with a capital of over half a million, has been marketing these tools for the past two years with great success, and another company has recently been promoted in England for the same purpose.

Mr. J. P. O'Donnell arrived in New York last Saturday for the purpose of investigating the pneumatic tool industry, as the representative of an English syndicate that is interested in the subject. Mr. O'Donnell has been identified with the railway signaling interests in time past. It is quite probable that upon his return to London he will be able to report favorably upon his mission. He will visit the various ship yards, railroad shops, locomotive and car works of this country to determine the extent of the use of pneumatic tools in these special lines.

A THRILLING MID-OCEAN RESCUE.

A thrilling tale of shipwreck and rescue in midocean was brought into New York this week by the British tramp steamer Glengoil, which arrived from Alexandria, Egypt. She had on board twenty-nine seamen rescued from the British ship Nonpareil, which foundered in latitude 39.50, longitude 42, on Sept. 22. Capt. Hatfield of the Nonpareil was among the saved. He said that his ship sailed from New York Sept. 10 bound for Sourabaya, Java, with a cargo of case oil. Two days after leaving Sandy Hook she ran into a hurricane. The seas boarded the vessel frequently, tons of water falling upon the deck doing considerable damage to the fittings and finally threw the vessel on her beam ends. The Nonpareil remained in this position, and all efforts to right her were unavailing. Conditions continued to grow worse for several days, and Monday, Sept. 17, the wind increased to a fresh gale, and the ship was under water on the port side. The gale became so violent the crew were set to work throwing over the cargo. The seas, which swept over the vessel, washed everything from the decks, filled the deckhouse and smashed the cabin skylights. The cabin was filled with water up to the deck. At 3 o'clock in the morning of Saturday, the 22nd, the ship was lying at an angle of 40 degrees and the crew were in constant danger of being washed overboard. The chief officer and several men had been injured. At 3:30 o'clock in the afternoon the Glengoil was sighted. She hove to and sent a boat and took off part of the men, the injured being the first. All had to jump overboard, and were hauled into the boat by a rope. When the boat returned to the Glengoil it was stove alongside, but its occupants were safely landed on board the steamer. Another boat was sent and made two trips successfully. The last trip of the boat was made after dark, and when she went alongside of the steamer F. George, one of the boat's crew, got crushed on the gunwale and was washed overboard and lost.

MODERN SHIP YARD MACHINES.

The Shipping World of London contains in its current issue an article upon the subject of machine tools in ship building and repairing. Sir William White, chief constructor of the British navy, said in his presidential address to the Institution of Mechanical Engineers that so long as wood was the principal material employed in ship building manual power reigned supreme in the largest and best equipped yards. Machinery was used little, if at all, in the operations of shaping, fixing, combining and fastening together the various parts of ships' structures. Forty years ago a royal dock yard had its steam factory and machine shops for the repair of engines and boilers; a millwrights' shop for dealing with ship fittings; its steam saw mills for converting timber; its roperies with suitable machines and special departments for block making or other manufactures. A few steam hammers were to be seen in the forges, steam capstans and cranes were installed around the basins, and steam pumps were used for the docks, but for ship building proper manual labor held its own. Individual pieces of the structure were shaped by hand and lifted by hand power winches as their size and weight were not considerable. Attempts were made from time to time to introduce new machines and to diminish hand labor, but few of these attempts succeeded. Even in the joiners' shops woodworking machines were then but little used.

The introduction of iron as a ship building material was responsible for the introduction of machine tools into the ship yards, and now machinery and labor-saving appliances abound. They are essential to rapid and economical handling. With iron ships of constantly increasing dimensions scantlings have become heavier, the sizes and weights of plates have increased, special arrangements have had to be made for transporting and handling materials, and the power of all classes of machinery has had to be increased proportionately. The old hand power winches have been replaced by the electric crane and traveling gantry, and the shipwright's adze and hammer have given place to the planing and bending machines, and to hammers and riveters driven by one or other of the power systems.

In the early days of iron ship building steam power alone was used, and the machine tools of ship yards were comparatively few and simple, and mostly borrowed from boiler shop practice. Now powerful hydraulic presses are used for flanging, "joggling," punching out rivets and lightening holes, plate bending and other heavy work. Electrical power is used chiefly for actuating what may be termed hand tools, such as electric drills, cutters for large holes in plating on sides or decks, planers for wood decks, caulkers, riveters, etc., while in some yards large machines are driven by separate motors. In a modern ship yard the following are the principal tools in use:

Flanging machines—The largest of these are now made so as to be capable of flanging cold at one stroke plates up to 33 ft. in length and 1¼ in. in thickness.

Joggling machines capable of dealing with plates up to 1 in. in thickness, also with angle bars.

Shearing machines—These are generally made for shearing plates up to 1¼ in. in thickness; but where the protective decks of warships have to be dealt with machines capable of shearing plates up to 2 in. in thickness are required.

Punching machines—Some of the largest machines now made will punch rivet holes out of 2 in. plates; but machines capable of punching rivet holes out of plates 1½ in. in thickness, are the more usual. Lightening machines capable of punching large lightening holes out of plates 1 in. thick at one stroke are also made.

Bending rolls—These are made in both vertical and horizontal types, and may be driven by steam, electrically, or hydraulically, and are made to bend plates 30 ft. to 35 ft. long and 1½ in. thick..

Straightening rolls—Examples of these have been seen, driven by electric motors, and able to deal with plates 7 ft. wide and 1½ in. thick.

Planing machines—The most recent types of these plane, edge, and butt simultaneously, and will deal with plates up to 35 ft. long.

Bevelling machines are now constructed for dealing with angle bars and Z bars of the heaviest sections.

Radial drills and countersinking machines—These are fitted with revolving arms 8 ft. long, capable of swinging through 180 degrees, and will drill holes up to 3 in. diameter, or larger with special cutters. Countersinking machines can deal with 700 to 1,200 holes per hour, according to the thickness of the plate.

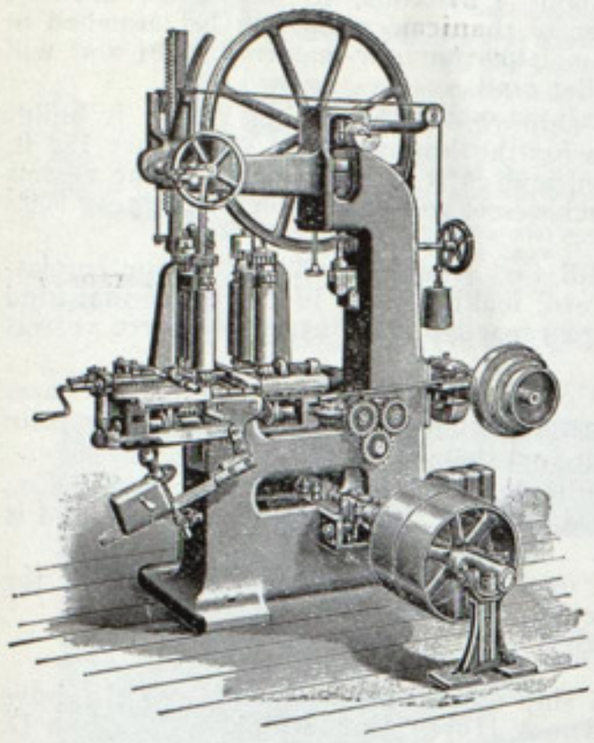
AN OLD ANCHOR FOUND.

When the steamship Niagara was weighing anchor at quarantine off New York harbor last Saturday the anchor was found to offer great resistance to the hoisting engine. When it was finally hauled above the water it was entangled with another one of huge dimensions, which had been lost by some vessel in days gone by. The derelict was secured and landed on pier 16, Prentice's stores. It is a huge affair and evidently belonged to a ship of the largest size. From point to point of the arms is a distance of over 7 ft. The flukes, or palms, are fully 2 ft. in width and fully as long. They are secured to the blades, as the extreme ends of the arms are called, by large rivets, the heads of which project far outside the flukes. The shank is a massive piece of iron that measures about 12 in. in diameter where it joins the arms at the crown. The stock, or crosspiece, which cants the anchor so that the bills, or points, must enter the ground, is more than 12 ft. in length, and it is 2 ft. in diameter where the shank passes through it. The two pieces of which the stock is made are held together by three massive iron rings on each side of the square. The stock is of oak and the antiquity of the relic is vouched for by the fact that the ends of the stock are so rotten that a big piece fell off one of them while it was being handled on the dock. Oak will remain sound under water for a great number of years, and it is not at all improbable that this relic belonged to one of the British men-of-war that served in and around New York in the days of the revolution. It must have taken a great length of years to decay the stout oak stock to its present condition, buried as it was beneath the water. The loss of such a valuable anchor is accounted for by the fact that the shackle which fastened the cable to the shank is broken off just at the bend.

The board of survey on the cruiser Montgomery has reported that it will be necessary to make repairs which will cost $167,000. The vessel will probably remain out of commission over a year.

FAY & EGAN BAND RE-SAW.

A machine just brought out by the J. A. Fay & Egan Co. of 325-345 West Front street, Cincinnati, is illustrated herewith. It is the Egan No. 2 band re-saw. This machine is entirely new and the manufacturers claim that for a band re-saw of medium capacity it is easily the best yet conceived. The main frame is cast hollow and the upper wheel is mounted on a heavy upright column. As the construction of this machine reduces very greatly the tendency to vibrate, it is claimed that it can be run at about twice the speed of other re-saws. The tension appliance is very sensitive and reliable and uniform on all occasions. The lower wheel is solid, and the upper has a lateral adjustment, without stopping the machine, to cause the saw to run in its proper path on the wheel. The feed is variable and on an improved principle, and the rolls will open to receive stock 24 in. wide and 8 in. thick. Rolls are self-centering. The inside rolls can be locked in position and the outside can be instantly moved to or from the saw by a lever convenient to the operator and gauged by an accurately-spaced quadrant—a feature not embodied in any other re-saw. The rolls can be tilted for sawing at a bevel. The manufacturers will gladly furnish prices and full particulars on application.



The bureau of construction and repair recommends that the Texas be placed out of commission and dry docked at Norfolk, and that the Indiana and Massachusetts be placed in ordinary and docked at New York. The repairs on the Texas will be extensive, but it is only estimated necessary to expend approximately $5,000 on each of the other ships.

TRADE NOTES.

A mechanical engineer having ten years' experience and first-rate technical training asks the Review to assist him in finding a position. Address Engineer, the Marine Review Pub. Co., Cleveland.

The Champion Rivet Co. of Cleveland had a display of their product at the recent convention of boiler manufacturers. It was in charge of David J. Champion. The Chicago Pneumatic Tool Co. was represented by C. E. Walker of St. Louis. The Lunkenheimer Co. of Cincinnati also had a display of their valves and steam fittings at the rooms where the convention held its sessions.

The Pelton Engineering Co. of Cleveland, who recently entered the machine tool field, have taken agencies for Becker & Brainard, milling machines; Whitcomb Co., planers; Draper Machine Tool Co., lathes; Silk-Anderson Co., lathes; Flather Co., shapers; Kelly Co., shapers; Sibley & Ware, drill presses, and several other lines. Recently they sold to the Buckeye Steam Fitting Co. of Cleveland a 9 to 16-in. Morris & Tasker pipe machine, claimed to be the largest machine of its kind in the state.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of October 3, 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	31	31⅝	30½	31⅛
American Steel & Wire, Pfd.....	72¾	73	72¾	73
Federal Steel	31¾	32⅛	31⅜	32
Federal Steel, Pfd.....	63	63¼	63	63¼
National Steel	24¾	25	24¾	24¾
National Steel, Pfd.....	82	.....	.....	82
American Tin Plate	27	28½	27	28½
American Tin Plate, Pfd.....	81	.....	.....	81
American Steel Hoop.....	17½	18⅜	17½	18⅜
American Steel Hoop, Pfd.....	65	.....	.....	65
Republic Iron & Steel	11	.....	.....	11
Republic Iron & Steel, Pfd	.....	.....	.....	.....

Paris Exposition, 1900, confers Highest Award and 2 Gold Medals

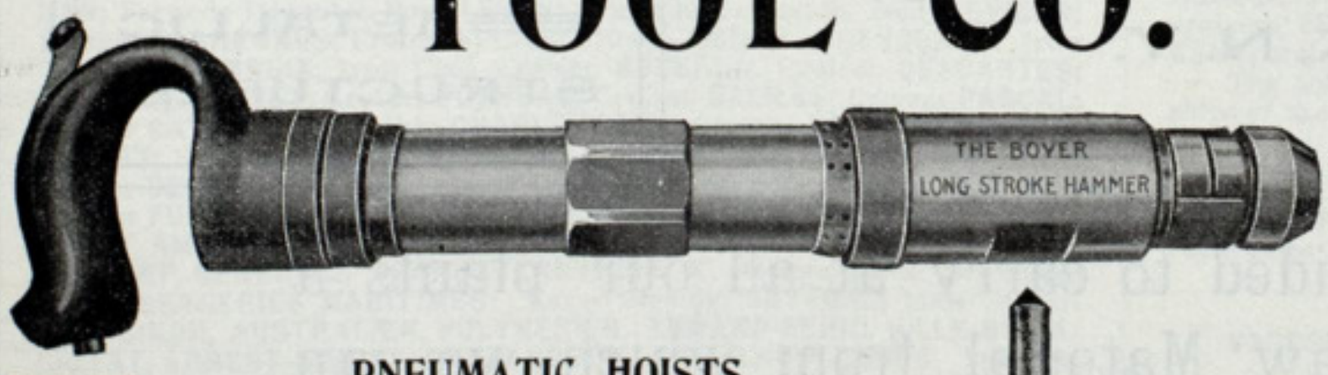
(Only Gold Medals in this Class.)

ON

CHICAGO PNEUMATIC TOOL CO.

HAMMERS
for Chipping
" Calking
" Riveting
" Beading
" Stone Cutting, etc.

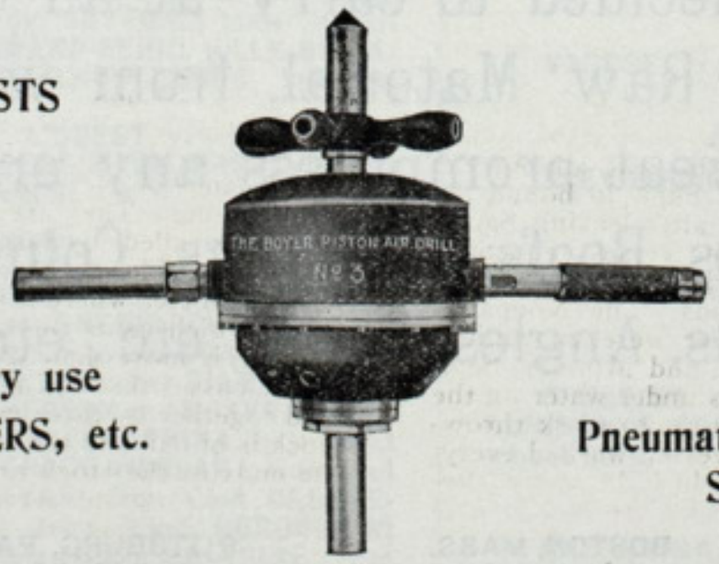
RIVETERS
for Shipyard use
" Boiler work
" Bridge work
" S ructural work



DRILLS
for Railroads
" Mines
" Quarries
" Foundries
" Machine Shops
" Wood boring

FLUE { Welders, Expanders, Reducers, Rollers, Cutters

PNEUMATIC HOISTS
CRANES
JACKS (Car and Locomotive)
PAINTING MACHINES
MOTORS for every use
CASTING CLEANERS, etc.



UNITED STATES COMMISSION
TO THE
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PARIS OFFICES.

August 21, 1900.

Chicago Pneumatic Tool Company,
Chicago.

Gentlemen:

Officially I desire to inform you that your pneumatic tools received at the hands of the International Jury of Award, a Gold medal. Also that Mr. Boyer was awarded a Gold Medal as collaborator and inventor of the tools.

Yours very truly,
F. E. Drake
Director of Machinery & Electricity.

Pneumatic Appliances Sent on Trial Subject to Approval.

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GENERAL OFFICES: Monadnock Block, Chicago.

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FOREIGN REPRESENTATIVES: THE NEW TAITS-HOWARD PNEUMATIC TOOL CO., LTD., General European Agents, 63 Queen Victoria Street, London, E. C. JOHN MACDONALD & SON, No. 9 York Street, Glasgow. SCHUCHARDT & SCHUITE, Spandauer-Strasse 59-61, Berlin, Germany; Brussels, Belgium; St. Petersburg, Russia; Vienna, Anstria; Stockholm, Sweden. H. GLAENZER & PERREAUD, 1 Avenue De La Republique, Paris, France and Spain. H. W. PEABODY & Co., Sydney, New South Wales.

ATLANTIC AND PACIFIC COAST.

PROGRESS OF CONSTRUCTION NOTED IN VARIOUS SHIP YARDS—A FEW LAUNCHES AND A FEW NEW ORDERS.

Plans are already under way for a passenger propeller of 175 ft. length, 30 ft. beam and 14½ ft. depth, to be built at the new ship yard of the Everett Ship Building Co., Everett, Wash., for the Thompson Steamboat Co. and to be engaged on Puget sound. Mr. Heath, manager of the new ship building company, was until recently with the Moran Bros. Co. of Seattle. Although the ship building company (capital $100,000) was organized only a few weeks ago, they agree to deliver this first boat in the spring. The new steamer will have triple expansion engines of 18, 30½ and 51 in. diameter, with a common stroke 28 in., and three Scotch boilers, each 10½x10½ ft. The boilers will be fitted with Howden hot draft apparatus and will be built for 180 lbs. steam pressure. The steamer will have an electric light plant and her auxiliary machinery will be modern in all respects.

The plant of the Eastern Ship Building Co., New London, Conn., is nearly in readiness to begin the building of steel vessels. Two hundred men are employed at the works, and it is said that within a month this number will be increased to 500. In the past week many pieces of machinery and a large quantity of steel plates arrived at the yards, the buildings have been equipped with electric lighting facilities and the work of preparing the ways has been pushed nearly to completion. The indications are that within a month the keels for two mammoth steel vessels, each about 700 ft. in length, will be laid.

The Ventura, third and last of the big freight and passenger steamships that are being built at Philadelphia for the Oceanic Steamship Co., was launched Tuesday from Wm. Cramp & Sons yard. Miss Elsie Cronsmiller, niece of John D. Spreckels, president of the company, gave the vessel its name. The Sierra and Sonoma, the Ventura's sister ships, will go on their trial trips in a few weeks. The Ventura is 400 ft. long, 50 ft. wide and 23 ft. deep. She is of 6,090 tons gross register, has twin screws and 7,500 H.P. All three of the vessels will ply between San Francisco and Australian ports.

A new steamer to be built by the W. R. Trigg Co., Richmond, Va., for the Chesapeake & Ohio railway, to ply between Newport News and Norfolk, in place of the steamer Louise, will be named the Virginia and will be a handsome vessel. Length at water line 190 ft.; length over all, 200 ft.; beam, 32 ft.; draught, 9 ft.; and displacement, 700 tons. She will have twin screws and two triple expansion engines, and the contract calls for a speed of 18 knots. Work will begin at once on this new steamer.

The Neafie & Levy Ship & Engine Building Co. of Philadelphia is experiencing great activity at its yard. Work on the three torpedo boats for the government is progressing rapidly, and they could be launched at an early date. The keel for the United States cruiser Denver has been laid, and workmen are now actively engaged on the frame. Contracts were recently signed for two large river passenger and freight steamers, and negotiations are about concluded for a large ocean tug.

McKay & Dix of Bucksport, Me., will launch, about Oct. 15, a four-masted wooden schooner of about 1,200 tons, to be named Edward Stotesbury. A sister four-master of the same mold will be launched in December. The firm will build a 1,400-ton four-master in 1901 and will probably build another and smaller craft.

George H. Hitchings at his ship yard in Hoquaim, Wash., is building three four-masted schooners for the lumber trade. They are 182 ft. 5 in. in length, 38 ft. 5 in. beam, and 14 ft. 5 in. in depth. The vessels are all from the same molds. Each vessel will be capable of carrying 900,000 ft. of lumber.

The Anderson-Middleton Mill Co., Aberdeen, Wash., is contemplating starting an additional ship yard, making three industries of that kind in that city. The yards will have a capacity for constructing three vessels at once.

The White Ship Building Co., Everett, Wash., is making preparations to start work on a four-masted schooner. This firm built the John S. Kimball for the Kimball Ship Co., San Francisco.

A new tug was launched at the yards of the Thomas McCosker Co., Baltimore, Md., last week. It was built for the Philip Weaver Co. and is 95 ft. long and 10.5 ft. beam.

A wooden schooner 180 ft. over all was launched this week at the Milford (Del.) ship yard of the W. G. Abbott Co.

GREAT ACTIVITY IN SHIPPING ON PACIFIC COAST.

Among firms and individual ship owners for whom the vessels above referred to were built, were Swayne & Hoyt, Hind Rolph & Co., John D. Spreckels & Bros., Charles Nelson, James H. Bruce, E. K. Wood, Simpson Lumber Co., C. A. Hooper, the Pacific Coast Steamship Co., Kimball Steamship Co., Renton, Holmes & Co., Hall Bros., Wilson Bros., Sudden & Christensen, F. P. & J. A. Hooper, Williams, Dimond & Co., Pollard & Dodge, Dolbeer & Carson, Alaska Packers' Association, Goodall, Perkins & Co., Alaska Commercial Co. and Truckee Lumber Co. Vessels are built on the Pacific coast at San Francisco, Seattle, Portland, Tacoma, Everett, North Bend, Grays Harbor, Eureka, Port Ludlow, Hoquiam, Port Blakeley, Marshfield, Aberdeen, Fairhaven, Coos Bay, New Whatcom, Fort Bragg and several other places.

At the Merchants Exchange, San Francisco, there was prepared recently a list of some seventy-three merchant vessels built in San Francisco and vicinity within the past two years. Most of them are, of course, wooden schooners of 400 to 700 tons, but the list shows that the shipping industry of the Pacific coast was never more prosperous than during the past two years. It is even now announced that although the coast fleet was increased by some thirty vessels taken around from the Atlantic, ship owners can still pick their charters.

The American liner New York broke her starboard thrust shaft on her last trip to Southampton.

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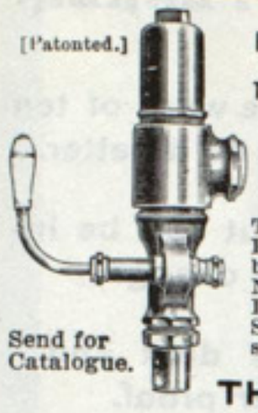

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NAVAL NOTES.

All of the bids received for the naval coaling station which is to be erected at Frenchman's Bay, Me., have been returned to the bidders. New bids will be opened by the bureau of equipment, navy department, Oct. 23.

The naval board of construction has decided to equip the new monitors with electrically-driven ventilator blowers. This is the result of a comparison between the Kearsarge and Alabama, the former of which has electrically-driven blowers and the latter steam fans.

The navy department has ordered a survey of the cruiser Baltimore, which was in Dewey's squadron at Manila. It is quite likely that she will need extensive repairs.

An advertisement has been prepared calling for bids for constructing the five battleships authorized by the acts of 1899 and 1900. The bids will be opened on Nov. 15.

The double-turreted monitor Amphitrite, which is now stationed at New Bedford, has been ordered to the Charlestown navy yard to receive a thorough overhauling preparatory to being sent to Port Royal, S. C., for the winter months. The Amphitrite is now serving as a gunnery practice ship.

It has been decided to sell the old single-turret monitor Nantucket and the naval tug Cheyenne. A naval board recently appraised the former at $15,000 and the latter at $5,000. No bids were received on Sept. 27, when proposals were to be opened for the purchase of the ships, and bids will be reinvited. The Nantucket was built in 1862 at the Atlantic works, Boston, Mass. The tug Cheyenne was built in 1855 by Sam Pregnall of Charleston, S. C.

U. S. Engineer Office, 185 Euclid Ave., Cleveland, O., September 8, 1900. Sealed proposals for constructing breakwater and piers at Black River Harbor, (Lorain) Ohio, will be received here until 2 P. M., standard time, Monday, October 8, 1900, and then publicly opened. Information on application. Jared A. Smith, Col., Engrs. Oct. 4.

U. S. Engineer Office, Detroit, Mich., Sept. 14, 1900. Sealed proposals will be received here until 12 noon, Oct. 30, 1900, and then publicly opened, for furnishing material and labor of all kinds necessary to construct and put in operation one large steel hulled self-propelling sea-going hydraulic dredge, with all necessary appliances complete, including electric light plant, distilling and refrigerating machinery. Information furnished on application. Thos. H. Handbury, Major, Engrs. Oct. 18.

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COMP. GENERALE TRANSATLANTIQUE: X, steamer of the Tarn class.

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ENGLISH NAVY.

Torpedo Boat Destroyer **SHARPSHOOTER**; **POWERFUL** and **TERRIBLE**, iron clad cruisers; **GLADIATOR, ARROGANT, FURIOUS, VINDICTIVE**, cruisers; **NIOBE, DIADEM, ANDROMEDA, EUROPA**, cruisers; **CANOPUS, GLORY, GOLIATH, ALBION, OCEAN**, iron clad ships; **ARGONAUT, ARIADNE, AMPHITRITE, SPARTIATE, HERMES, HIGHFLYER** and **HYACINTH**, cruisers; **VENGEANCE**, iron clad; **ALBERT AND VICTORIA**, royal yacht; **CONDOR** and **ROSARIO**, sloops; **CRESSY, ABOUKIR, SUTLEY** and **HOGUE**, cruisers; **IMPLACABLE, FORMIDABLE** and **IRRESISTIBLE, VENERABLE, LONDON, BULWARK**, iron clad ships; **EURYALUS, BACCHANTE**, cruisers; **MUTINE, RINALDO, SHEARWATER**, sloops; **CORNWALLIS, DUNCAN, EXMOUTH, RUSSEL**, iron clad ships; **DRAKE, KING ALFRED, LEVIATHAN, AFRICA**, cruisers; **VESTAL**, sloop; **MONMOUTH**, cruiser; **BEDFORD**, cruiser; **ESSEX, KENT**, cruisers; **ALBEMARLE, MONTAGU**, battleships.

The total horse power of boilers fitted on board the 57 above named ships of the British navy is nearly 900,000.

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ITALIAN NAVY.

VARESE, cruiser; **BENEDETTO BRIN**, battleship.

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SPANISH NAVY.

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O'HIGGINS, cruiser; **ALMIRANTE LYNCH**, torpedo boat destroyer; **ALMIRANTE CONDELL**, torpedo boat destroyer; **JENERAL BAQUEDANO**, school ship.

JAPANESE NAVY.

SHIKISHIMA, iron clad; **CHIYODA**, cruiser; **ASAHI**, iron clad; **IWATE**, cruiser; **AZUMA**, cruiser; **HATSUSE**, iron clad; **ITSUKUSHIMA**, iron clad coast guard; **MIKASA**, battleship; **IZUMO**, cruiser.

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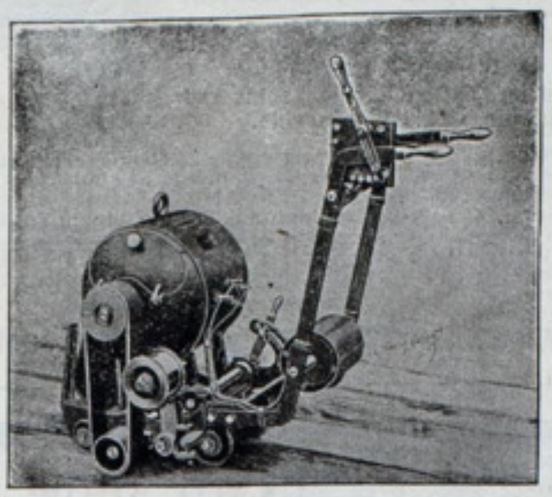

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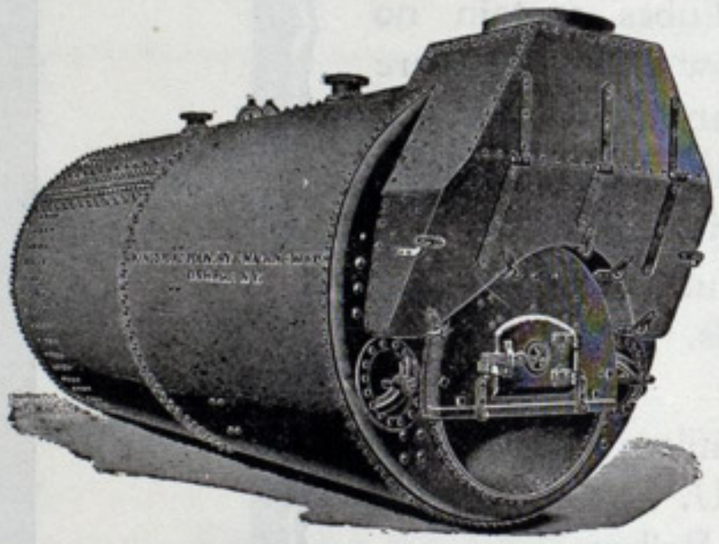

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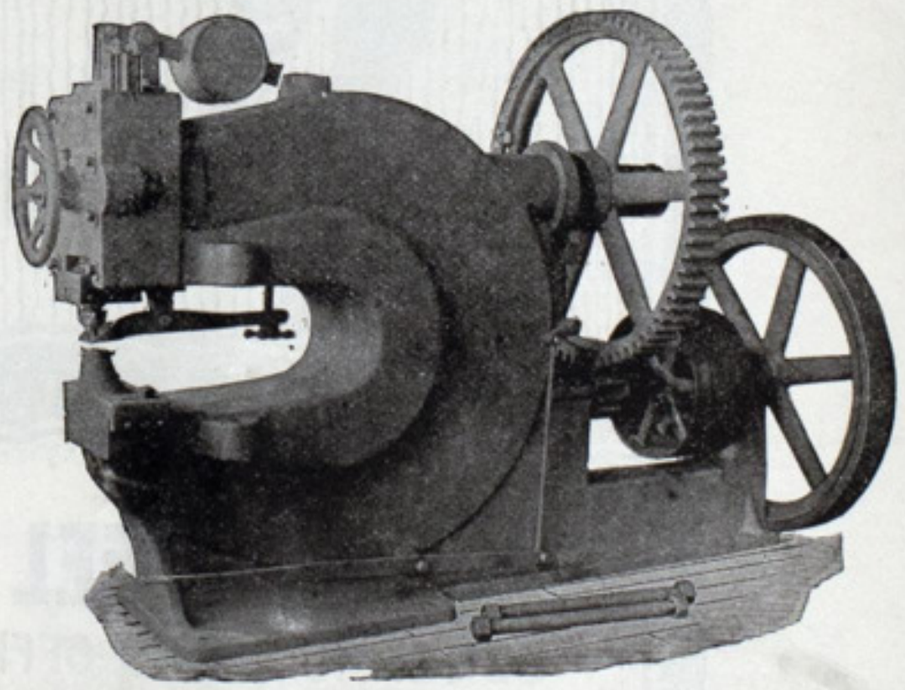

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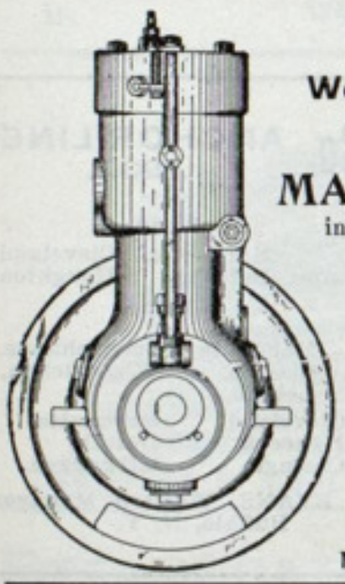

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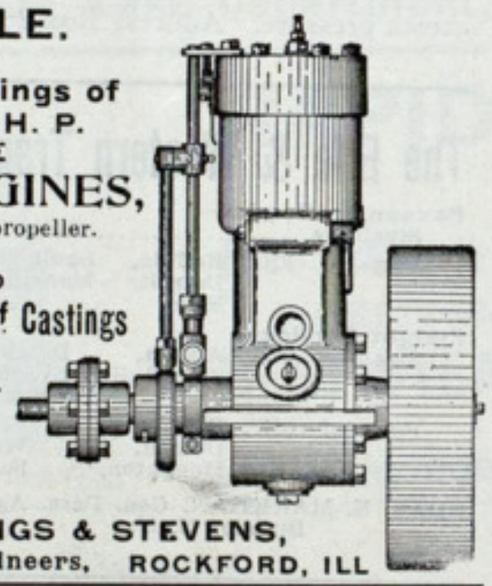

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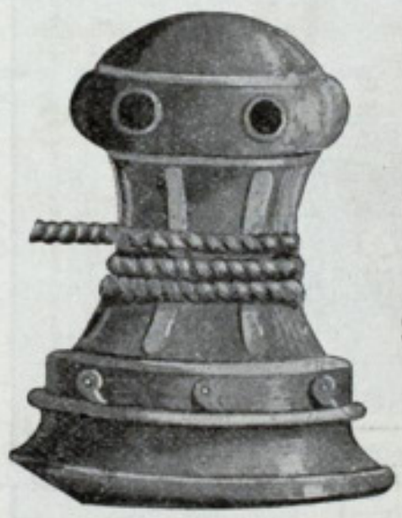

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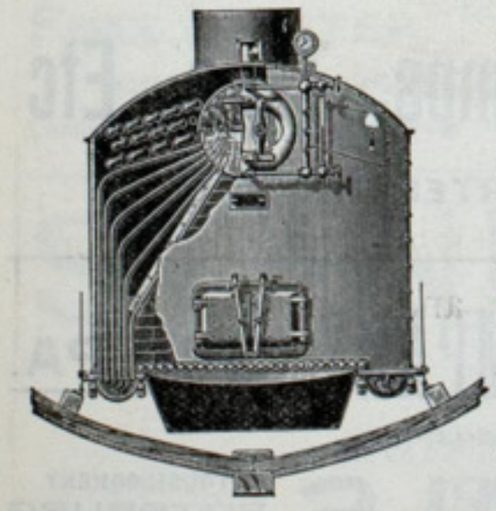

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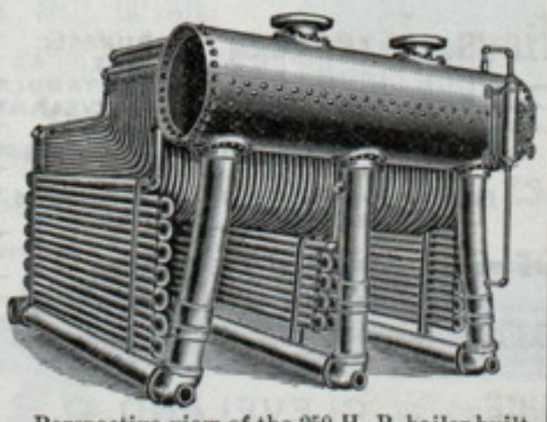

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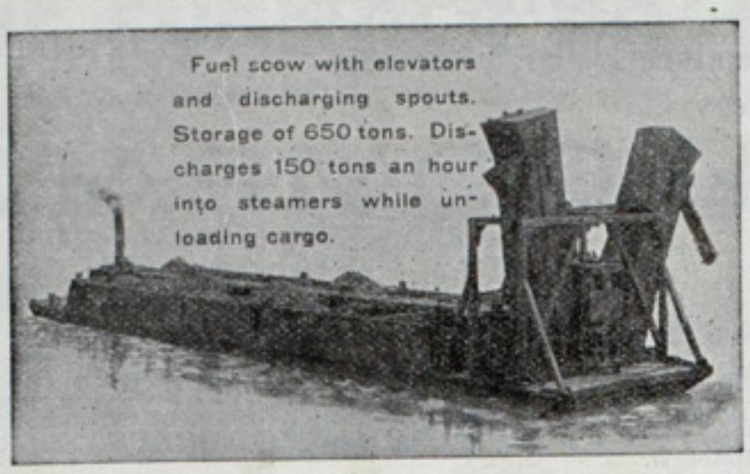

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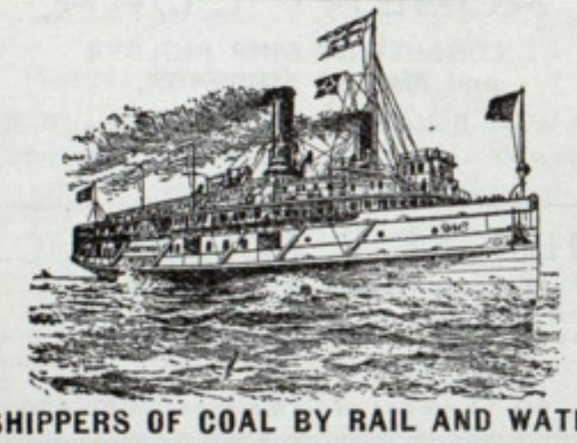

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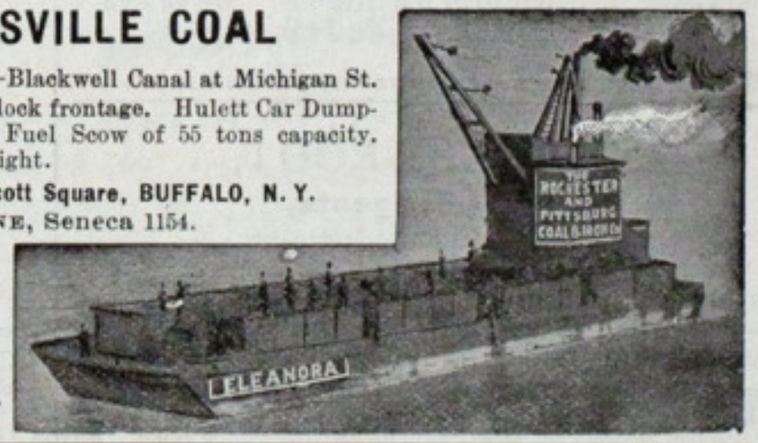

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Farrar & Trefts.....Buffalo.
Fore River Engine Co..... .....Weymouth, Mass
Hardy, John B..... .....Tacoma, Wash.
Hyde Windlass Co.....Bath Me.
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Jenks Ship Building Co.....Port Huron, Mich.
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Moran Bros. Co.....Seattle, Wash.
Morse Iron Works & Dry Dock Co.....Brooklyn.
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Nixon, Lewis.....Elizabeth, N. J.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works.....San Francisco.
Sheriffs Mnfg. Co.....Milwaukee.
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Trout, H. G.....Buffalo.
Union Iron Works.....San Francisco.

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Niles Tool Works Co.....Hamilton, O.
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Ashton Valve Co.....Boston.
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Baker, Howard H. & Co.....Buffalo.
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Wilson & Silsby.....Boston.

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See wrecking companies.

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American School of Correspondence.....Boston.
International Correspondence Schools.....Scranton, Pa.

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Niles Tool Works Co.....Hamilton, O.

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Elwell-Parker Electric Co.....Cleveland.
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Rushmore Dynamo Works.....Jersey City, N. J.
Westinghouse Electric & Mnfg. Co...Pittsburg, Pa.

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American Ship Building Co.....Cleveland.
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Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Shipbuilding Co.....Detroit.
Fore River Engine Co.....Weymouth, Mass.
Hardy, John B.....Tacoma, Wash.
Harlan & Hollingsworth Co.....Wilmington, Del.
Jenks Ship Building Co.....Port Huron, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
Moran Bros. Co.....Seattle, Wash.
Morse Iron Works & Dry Dock Co.....Brooklyn.
Neafie & Levy Ship & Eng. Bldg. Co .Philadelphia.
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Nixon, Lewis.....Elizabeth, N. J.
Pusey & Jones Co.....Wilmington, Del.
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Union Dry Dock Co.....Buffalo.
Union Iron Works.....San Francisco.
Willard, Chas. P. & Co..... .....Chicago.

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Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
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Pittsburgh Testing Laboratory, Ltd.....Pittsburgh.

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Chase Machine Co.....Cleveland.
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Calvin Co., The.....Kingston, Ont.
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Swain Wrecking Co.....Detroit.

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Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
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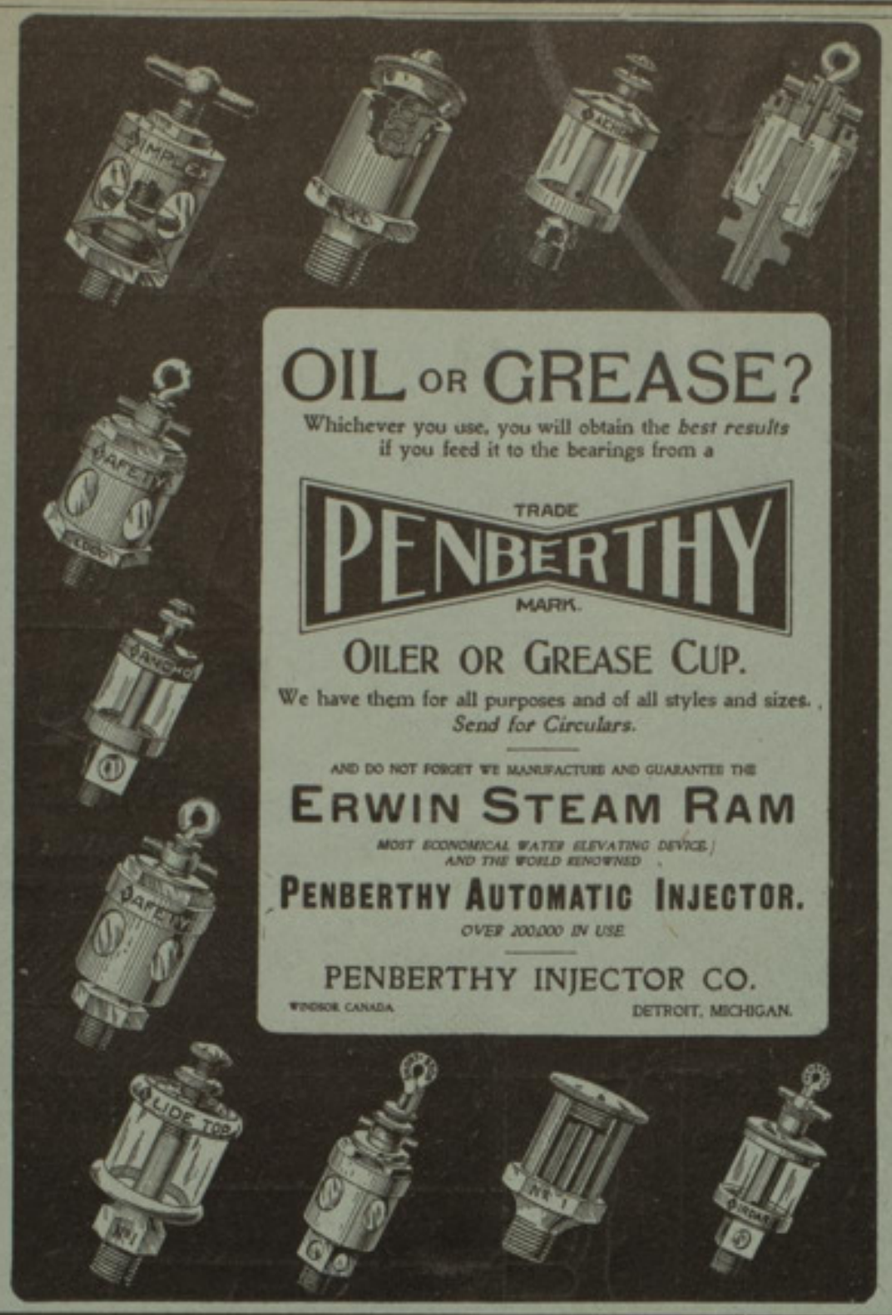

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No. 44,	Accommodation, via Sandusky	†1 25 pm	.....
No. 46,	Southwestern Express	.....	*3 00 pm
No. 6,	Limited Fast Mail	*5 40 pm	*5 45 pm
No. 10,	Chicago, New York & Boston Special	*7 35 pm	*7 40 pm
No. 16,	New England Express	*10 30 pm	*10 35 pm
No. 2,	Day Express	†9 05 pm	†9 20 pm
No. 126,	Norwalk Accommodation	†7 55 am	.....
No. 40,	Toledo & Buffalo Accom., via Norwalk.	†10 00 am	†10 30 am
No. 126,	Norwalk Accommodation	†7 55 am	.....
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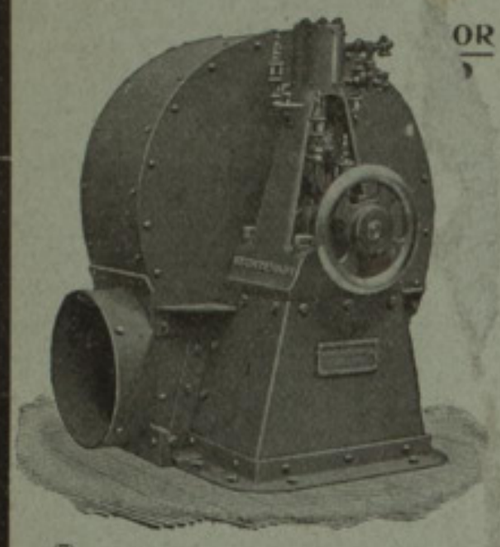

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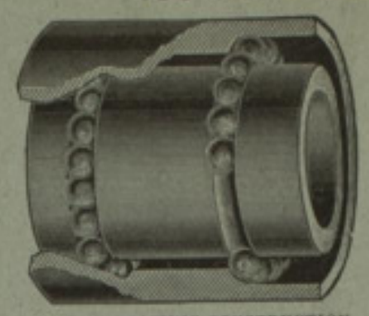

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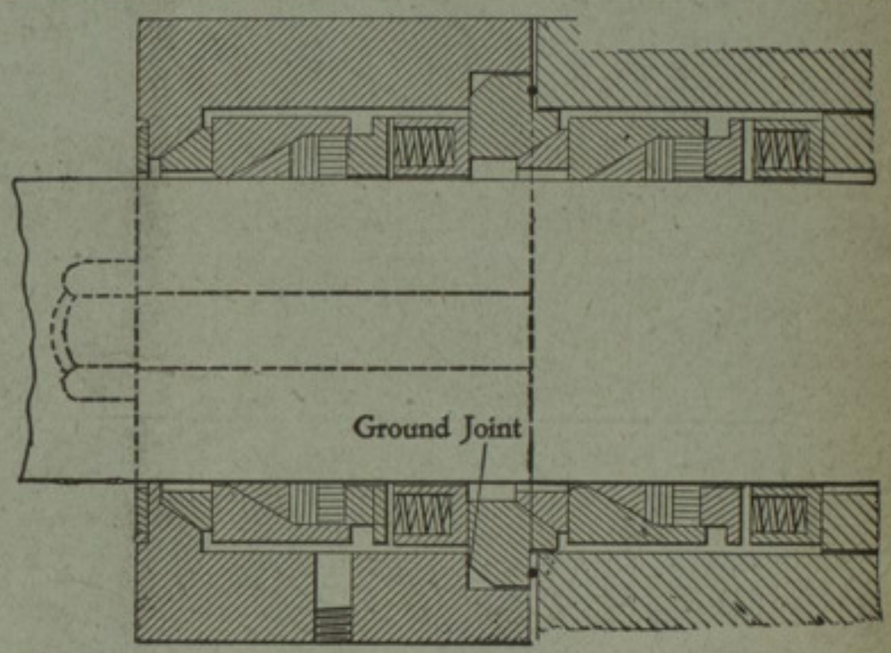

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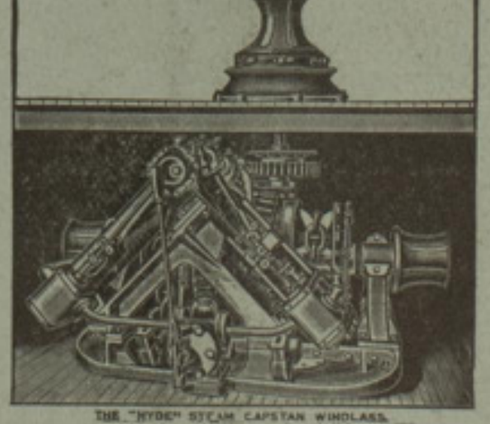

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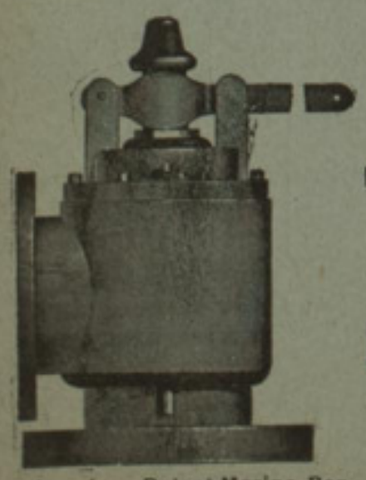

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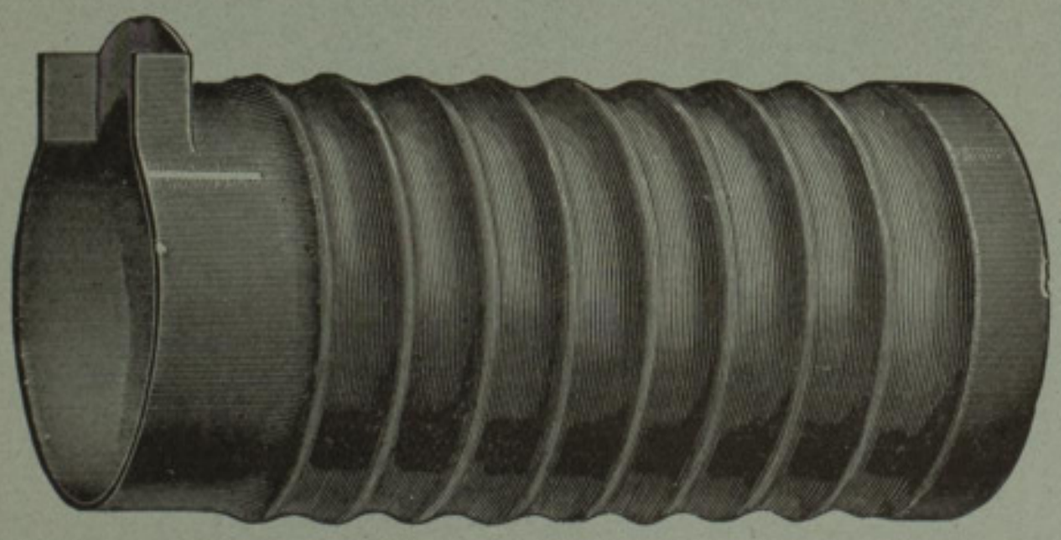

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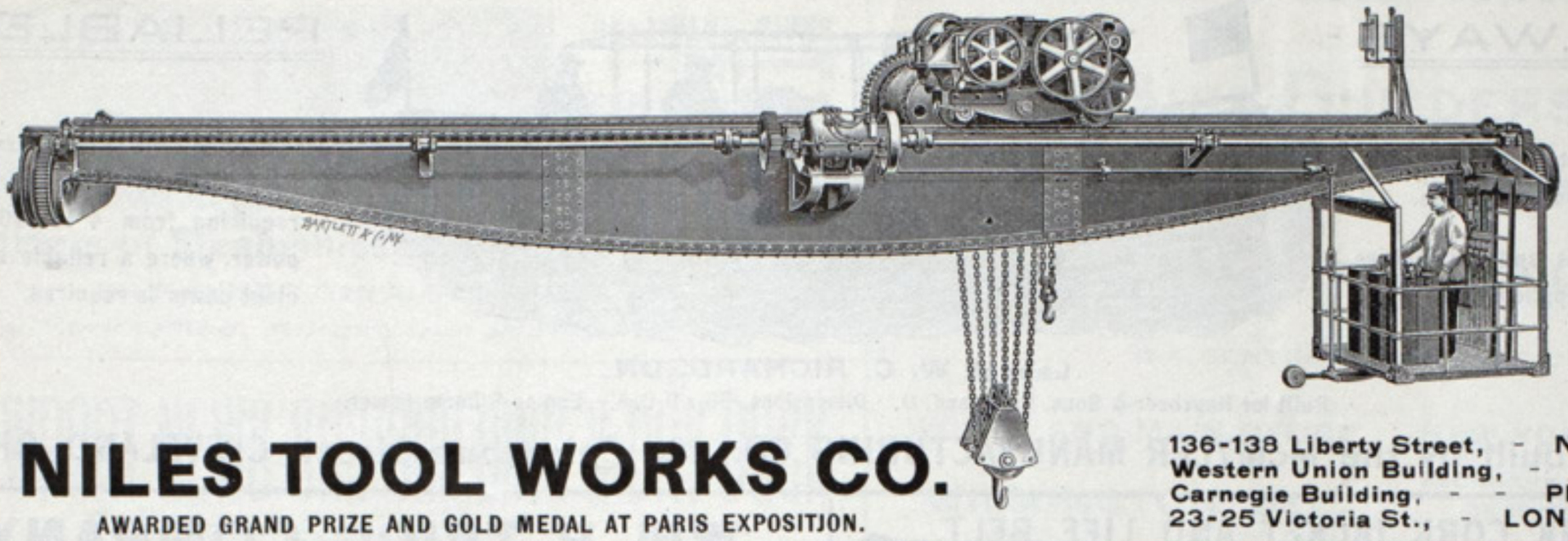

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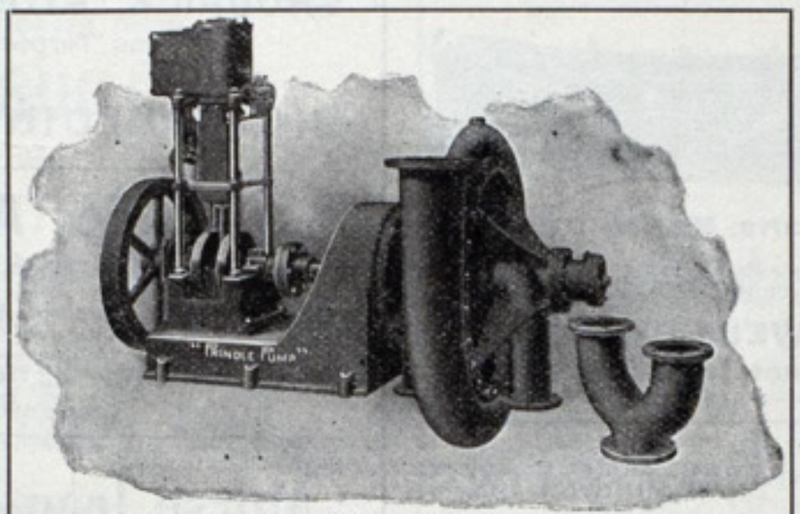

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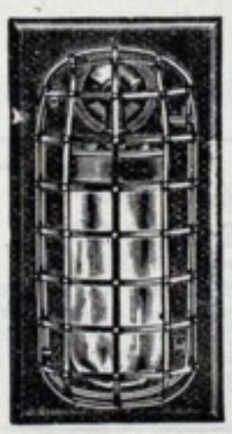

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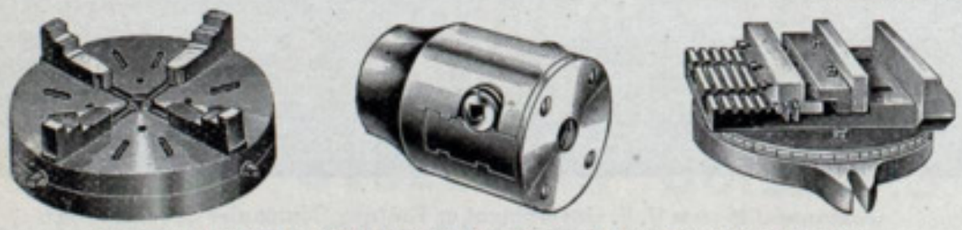

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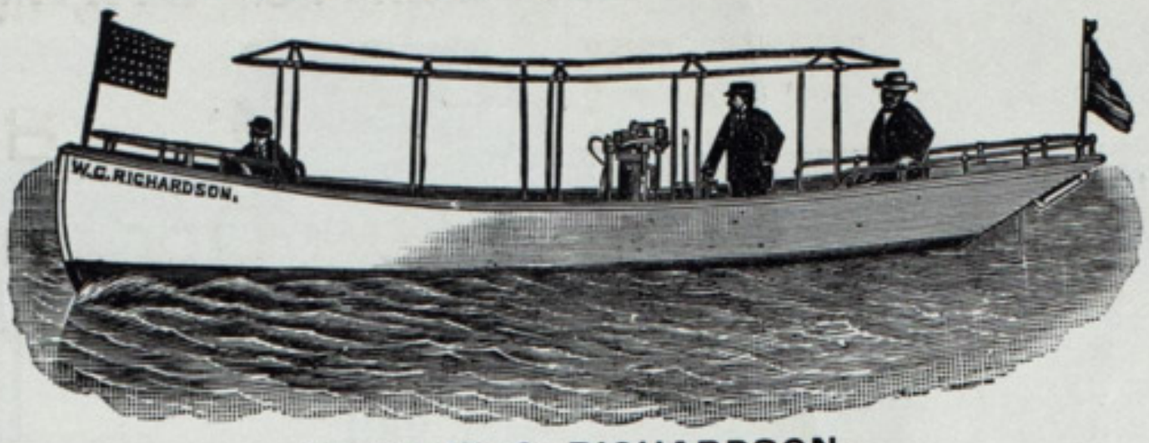

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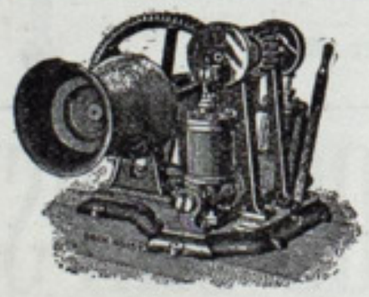

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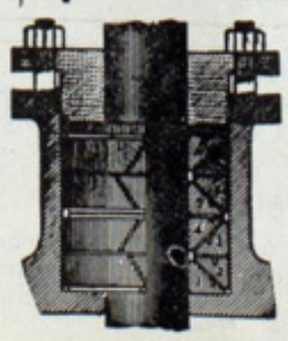

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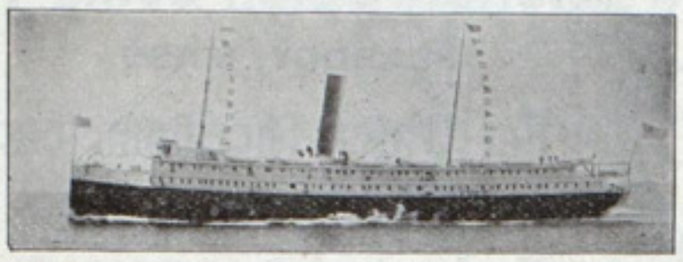

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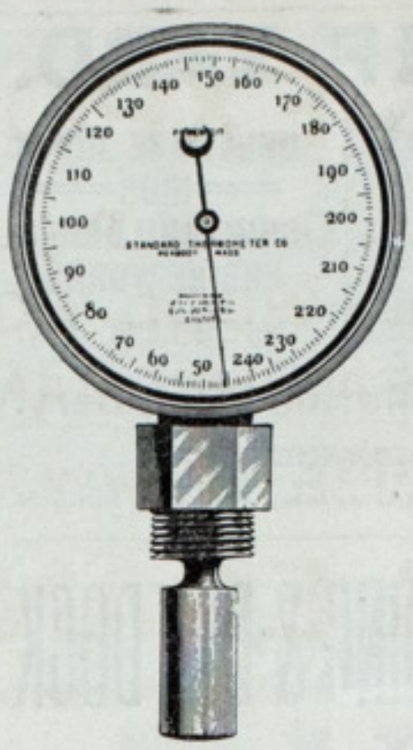

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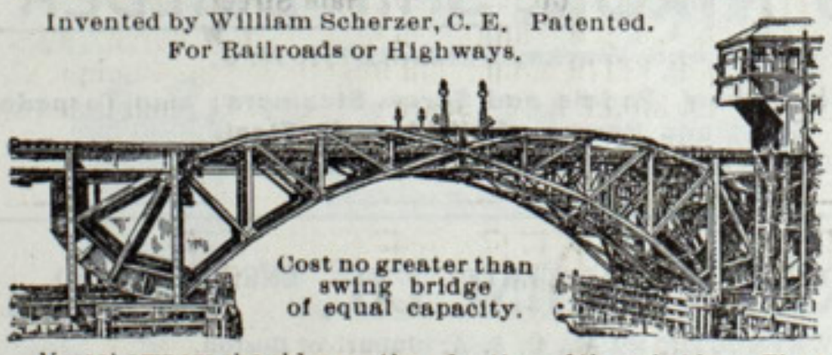

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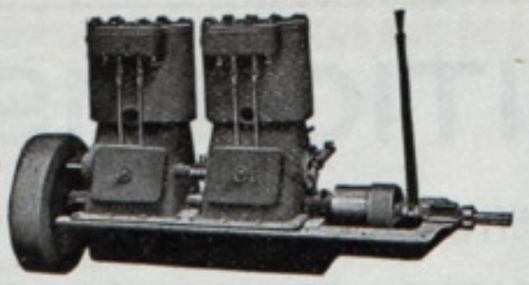

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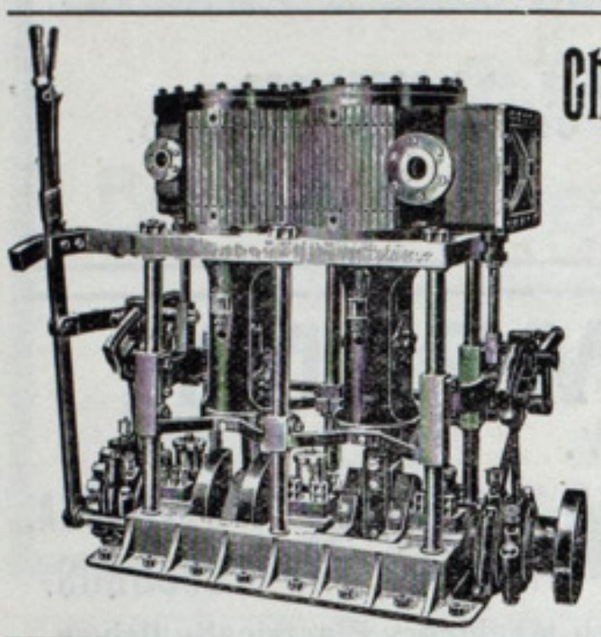

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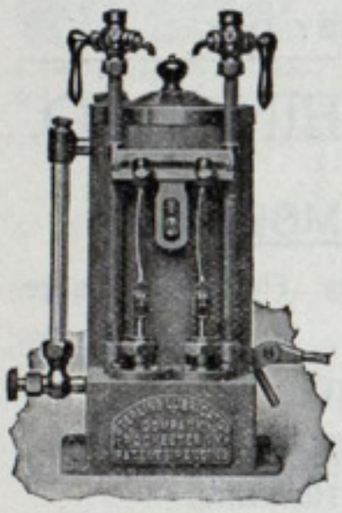

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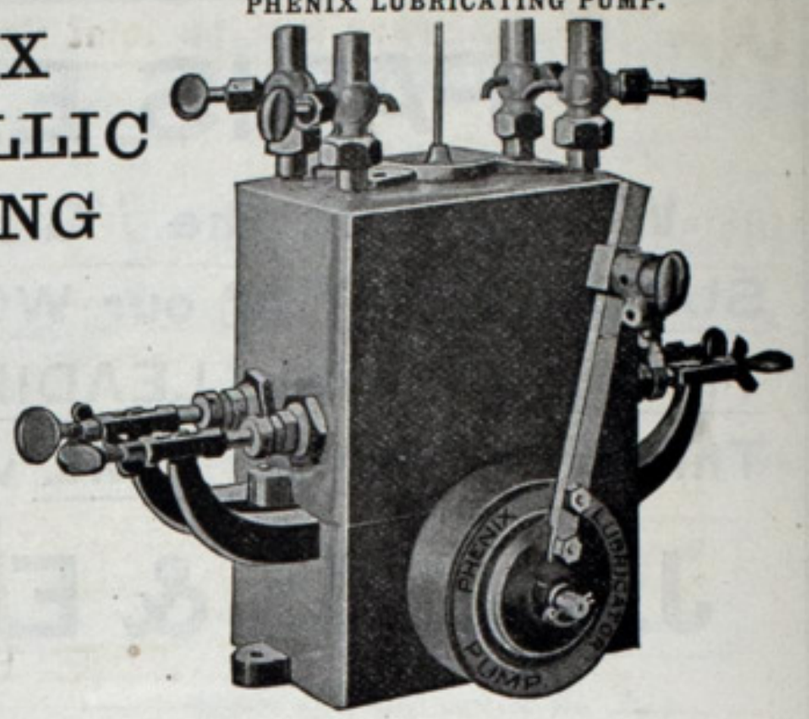

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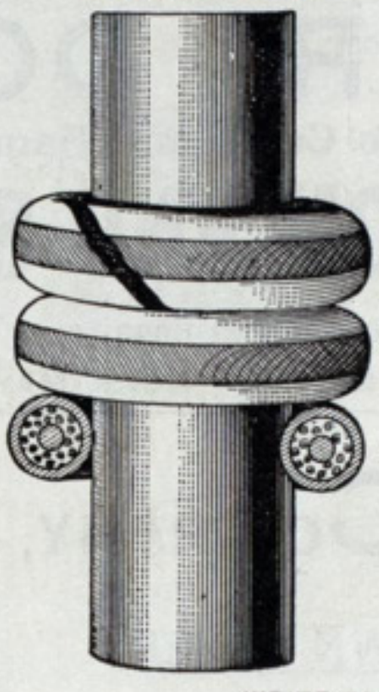

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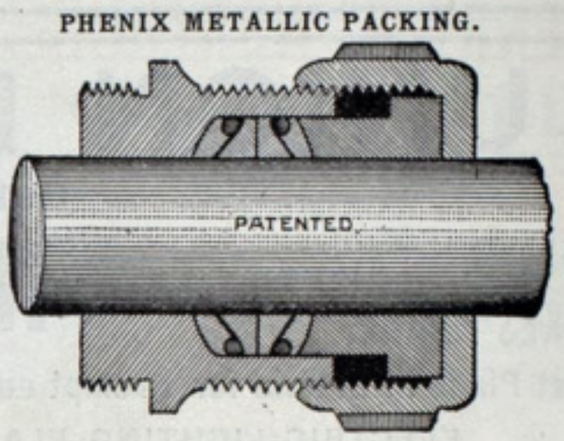

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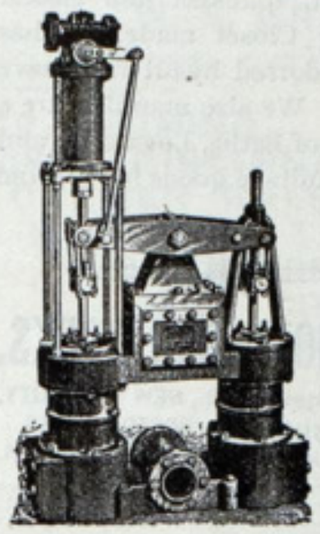

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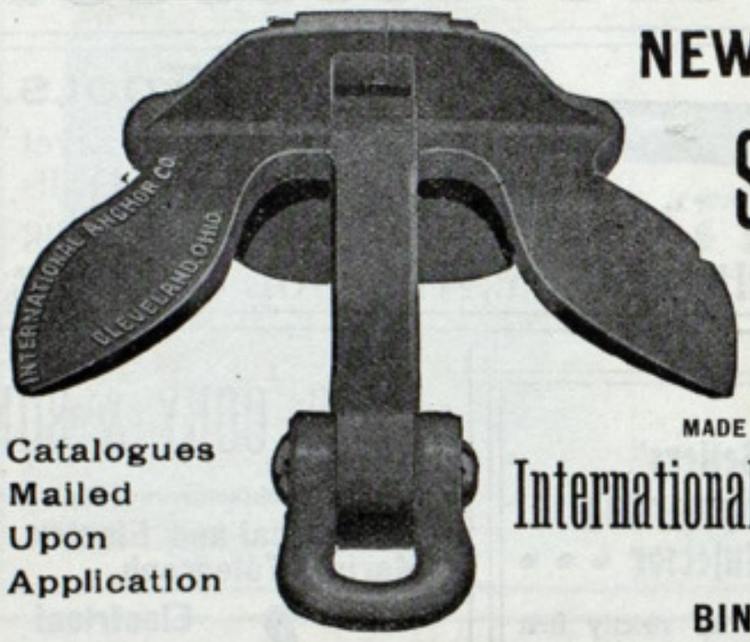

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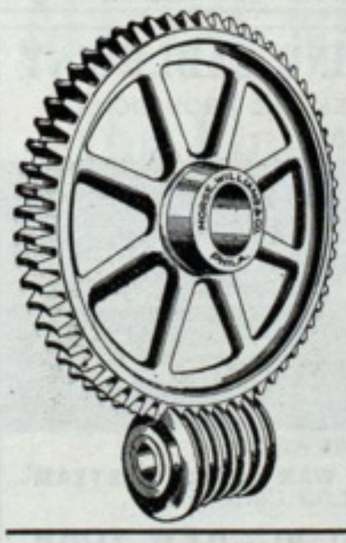

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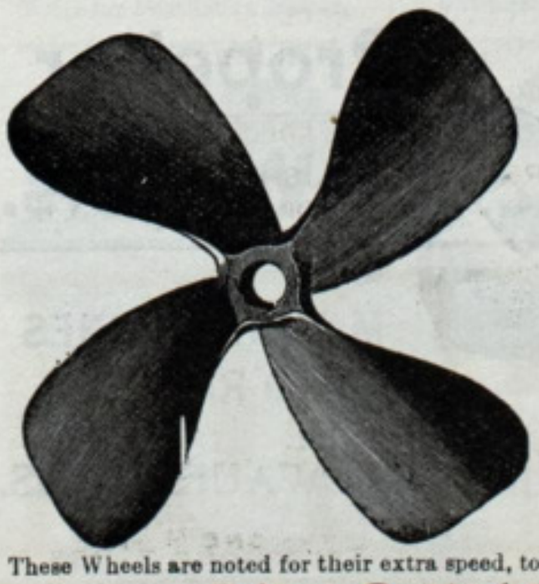

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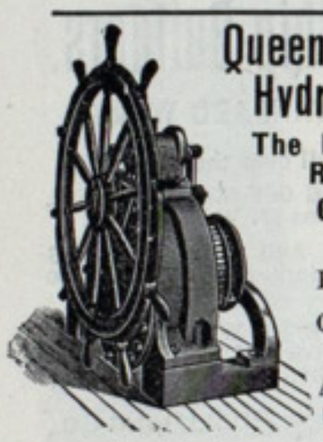

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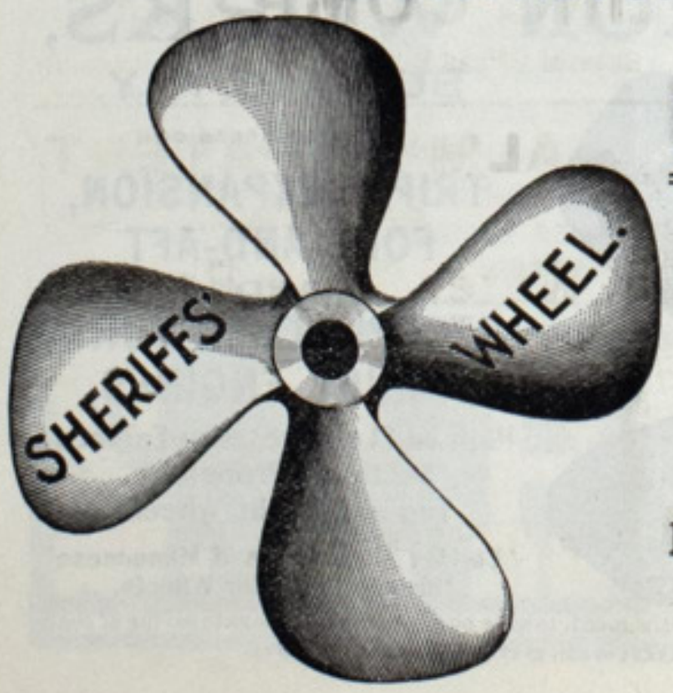

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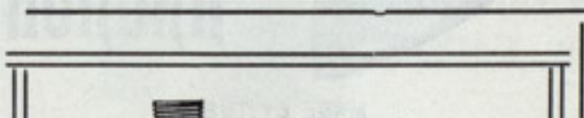

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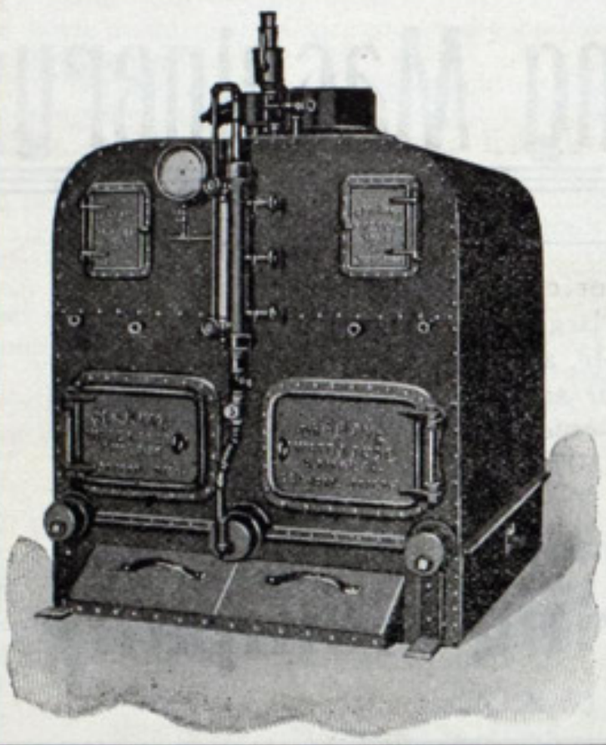

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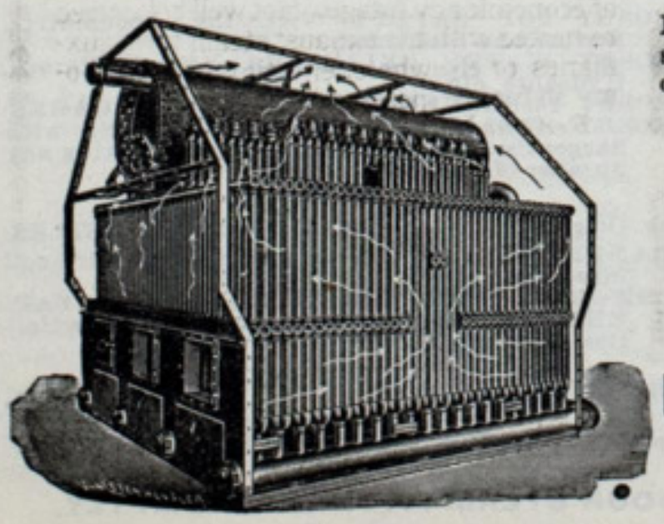

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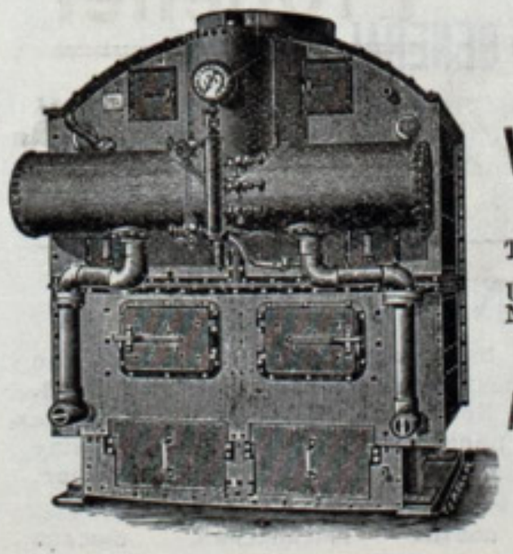

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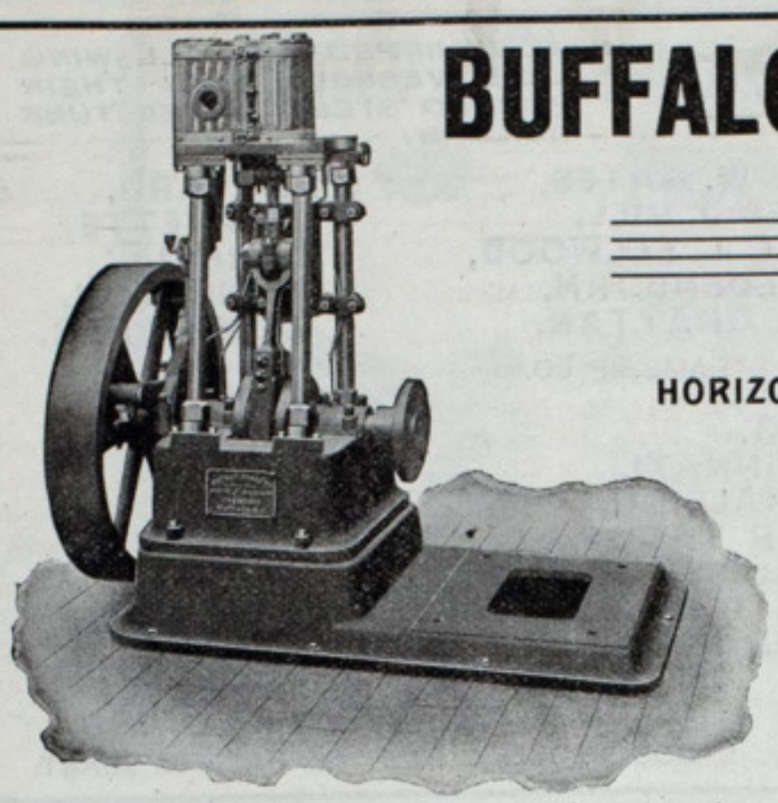

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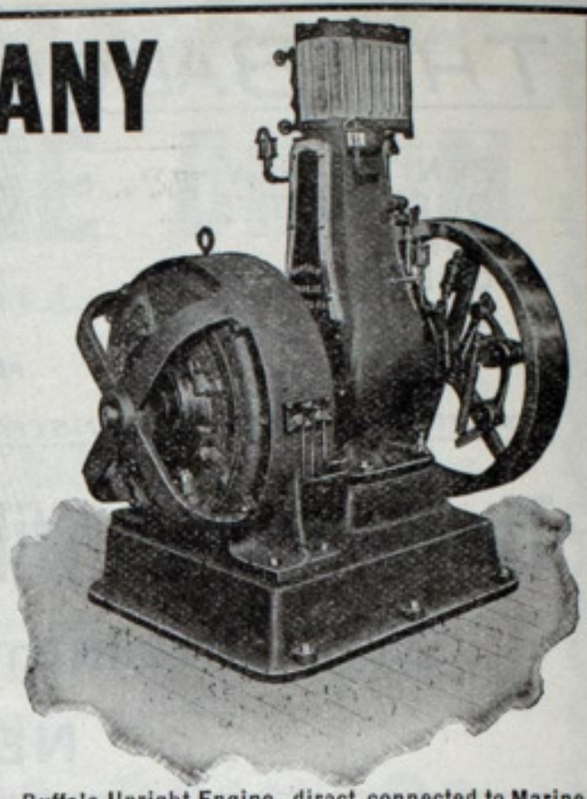

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The illustration shows a machine designed especially for cutting sheet metal. It is a continuous shear made in three sizes. The cut shows the largest size, the No. 4 B. The smallest size cuts up to 3-16-inch sheets, the next size to 5-16, and the machine shown cuts up to ½-inch sheets. They all cut sheets of any width or any length. These machines are shipped complete and ready for use. They are made especially for the use of boiler makers and sheet metal workers. The two larger sizes can also be supplied with a special attachment for beveling sheets.

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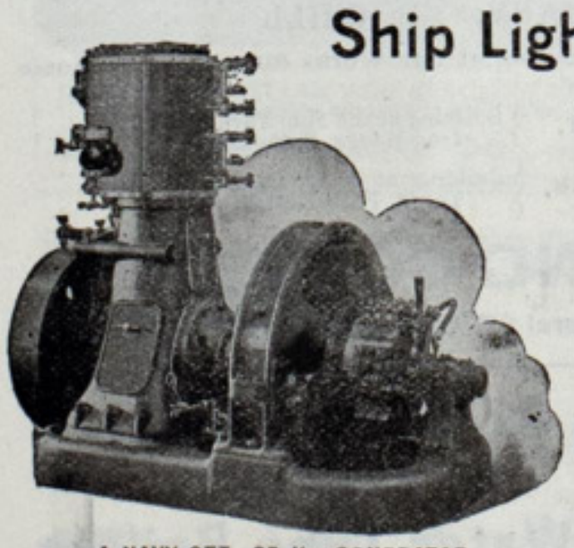

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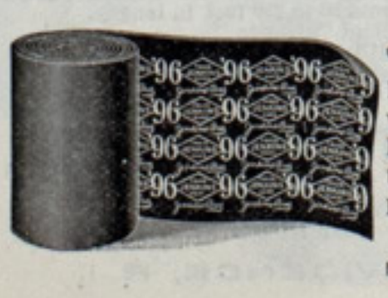

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